

A Scanning Electron Microscope
Survey of the Epidermis
of East African Grasses, IV

*Patricia G. Palmer
and Susan Gerbeth-Jones*



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ABSTRACT

Palmer, Patricia G., and Susan Gerbeth-Jones. A Scanning Electron Microscope Survey of the Epidermis of East African Grasses, IV. *Smithsonian Contributions to Botany*, number 62, 120 pages, 86 plates, 1986.—In developing a reference collection as a standard for using fossil grass cuticles as a paleoecological tool, we have examined leaf epidermal features of grasses using SEM. Descriptions (abaxial and adaxial surfaces) of 43 East African species are presented comprising three tribes: Arundinelleae, Isachneae, and Paniceae.

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Contents

	<i>Page</i>
Introduction	1
Acknowledgments	1
Materials and Methods	1
Format for Species Descriptions	2
Tribe ARUNDINELLEAE	2
<i>Arundinella nepalensis</i> Trinius	2
<i>Gilgichloa indurata</i> Pilger	3
<i>Loudetia arundinacea</i> (A. Richard) Steudel	3
<i>Trichopteryx stolziana</i> Henrard	4
<i>Tristachya bequaertii</i> De Wildeman	4
<i>Zonotriche inamoena</i> (K. Schumann) W.D. Clayton	5
Tribe ISACHNEAE	6
<i>Coelachne africana</i> Pilger	6
<i>Heteranthoecia guineensis</i> (Franchet) Robyns	6
<i>Isachne buettneri</i> Hackel	7
Tribe PANICEAE	8
<i>Acritochaete volkensis</i> Pilger	8
<i>Acroceras zizanioides</i> (Kunth) Dandy	8
<i>Alloteropsis angusta</i> Stapf	9
<i>Anthephora elongata</i> De Wildeman	10
<i>Axonopus flexuosus</i> (Peter) Troupin	10
<i>Brachiaria brizantha</i> (A. Richard) Stapf	11
<i>Cenchrus ciliaris</i> Linnaeus	11
<i>Chaetopoa taylori</i> C.E. Hubbard	12
<i>Chloachne oplismenoides</i> (Hackel) Robyns	13
<i>Chlorocalymma cryptacanthum</i> W.D. Clayton	13
<i>Cyrtococcum multinode</i> (Lamarck) W.D. Clayton	14
<i>Digitaria diagonalis</i> (Nees) Stapf var. <i>uniglumis</i> (A. Richard) Pilger	15
<i>Eccoptocarpa obconiciventrifera</i> Launert	15
<i>Echinochloa haploclada</i> (Stapf) Stapf	16
<i>Entolasia imbricata</i> Stapf	17
<i>Eriochloa meyerana</i> (Nees) Pilger	17
<i>Holcolemma inaequale</i> W.D. Clayton	18
<i>Hylebates chlorochloae</i> (K. Schumann) Napper	19
<i>Melinis ambigua</i> Hackel	19
<i>Odontelytrum abyssinicum</i> Hackel	20
<i>Oplismenus burmannii</i> (Retzius) P. Beauvois	21
<i>Panicum trichoides</i> Swartz	21
<i>Paspalidium geminatum</i> (Forsskal) Stapf	22
<i>Paspalum conjugatum</i> Berg	23

<i>Pennisetum purpureum</i> Schumacher	23
<i>Pseudechinolaena polystachya</i> (Kunth) Stapf	24
<i>Rhynchelytrum kallimorphon</i> W.D. Clayton	25
<i>Sacciolepis africana</i> C.E. Hubbard and Snowden	25
<i>Setaria plicatilis</i> (Hochstetter) Engler	26
<i>Snowdenia petitiiana</i> (A. Richard) C.E. Hubbard	27
<i>Stenotaphrum dimidiatum</i> (Linnaeus) Brongniart	28
<i>Stereochlaena caespitosa</i> W.D. Clayton	28
<i>Tricholaena teneriffae</i> (Linnaeus f.) Link	29
<i>Urochloa mosambicensis</i> (Hackel) Dandy	30
Appendix: Material Studied	31
Literature Cited	33
Plates	34
Index to Grass Species	120

A Scanning Electron Microscope Survey of the Epidermis of East African Grasses, IV

*Patricia G. Palmer
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Introduction

This paper represents the fourth part of a survey of East African grasses. The purpose of this survey is to develop a reference collection of the microanatomical features of the leaves of modern grasses. The reference collection will provide a standard of comparison for identifying fossil leaf fragments that are abundant in East African lake sediments (Palmer, 1976). As in the first three volumes of this survey (Palmer and Tucker, 1981, 1983; Palmer, Gerbeth-Jones, and Hutchison, 1985), we are examining the grass leaves using scanning electron microscopy (SEM). The reader should refer to the first volume (Palmer and Tucker, 1981) for discussion of terminology and illustrations of diagnostic features.

This volume includes 43 genera representing three tribes: Arundinelleae, Isachneae, and Paniceae.

We delimit East Africa to include Uganda, Kenya, and Tanzania, the region dealt with in the *Flora of Tropical East Africa, Gramineae* by

Clayton (1970, 1974, 1982). We also follow the nomenclature of the *Flora of Tropical East Africa*.

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MATERIALS AND METHODS.—Leaf material for scanning electron microscopy was taken from dried herbarium material. A section from the middle portion of a blade from an upper, mature, undamaged leaf was chosen for study. Wax was removed by soaking the specimen in xylene for 24 hours. Two pieces of the leaf (one exposing the abaxial or lower surface, the other exposing the adaxial or upper surface) were mounted on stubs with double-coated Scotch tape. The specimens were sputter-coated with gold-palladium, observed with a JEOL T20 or a Philips 501

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scanning electron microscope, and photographed using Polaroid P/N 665 or P/N 55 film. Occasionally, specimens were examined by energy dispersive X-ray analysis using the EDAX 9100/60 to clarify certain anatomical features. The photomicrographs are deposited in the laboratory of D.A. Livingstone, Department of Zoology, Duke University.

Format for Species Descriptions

STOMATA.—Frequency; subsidiary cell shape; distribution; special features.

LONG CELLS.—Shape; outline of walls. *Papillae*: Number/cell, distribution on each cell, shape, size.

PRICKLES.—Frequency; location and type.

SHORT CELLS.—Location and distribution. *Silica Cells*: Location and frequency. *Cork Cells*: Location and frequency.

SILICA BODIES.—Location and shape.

MICROHAIRS.—Frequency; number of cells; shape; shape of apex.

MACROHAIRS.—Frequency; location; nature of base.

SPECIAL FEATURES.—Description of unique features not covered in other categories.

Tribe ARUNDINELLEAE

Arundinella nepalensis Trinius

PLATES 1–2

ABAXIAL

STOMATA.—Abundant; low-dome; 2–3 stomatal bands/intercostal zone, 1–2 rows/band. Intercostal zone is very wide (Plate 1*a,b*).

INTERSTOMATAL CELLS.—Rectangular, long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Interstomatal cells are often interrupted by short cells (Plate 1*a,b,c*).

LONG CELLS.—Long, narrow, width uniform;

markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 1*b,c*).

PRICKLES.—Common; costal and intercostal prickles, occasionally intercostal hooks (Plate 1*d*).

SHORT CELLS.—Costal solitary, paired, 3–5/row; intercostal solitary, paired. *Silica Cells*: Costal and intercostal abundant. *Cork Cells*: Costal and intercostal abundant (Plate 1*a,b,e*).

SILICA BODIES.—Costal and intercostal highly variable from elliptical to round to square to crescent-shaped to narrowly saddle-shaped (Plate 1*b,e*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, long; apex tapered. Basal and apical cells are usually collapsed (Plate 1*e*).

MACROHAIRS.—Infrequent, intercostal; basal cells markedly raised (Plate 1*f*).

ADAXIAL

STOMATA.—Abundant; low-dome; 2 stomatal band/intercostal zone, 1–3 rows/band (Plate 2*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 2*a*).

LONG CELLS.—Rectangular, long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 2*a,c,d*).

PRICKLES.—Common; costal prickles; intercostal prickles and hooks (Plate 2*c*).

SHORT CELLS.—Costal and intercostal solitary, paired. *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal common (Plate 2*d,e*).

SILICA BODIES.—Costal and intercostal shape highly variable from round to square to elliptical to crescent-shaped to saddle-shaped to cross-shaped (Plate 2*a,d,e*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, long; apex tapered (Plate 2*e*).

MACROHAIRS.—Infrequent; intercostal; basal cells markedly raised (Plate 2*f*).

Gilgiochloa indurata Pilger

PLATES 3-4

ABAXIAL

STOMATA.—Common; low-dome or sometimes collapsed and appearing parallel; 2-3 stomatal bands/intercostal zone, 1-2 rows/band (Plate 3*b,c*).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 3*c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 3*c,e*).

PRICKLES.—Common; costal and intercostal prickles (Plate 3*c,d*).

SHORT CELLS.—Costal paired, 3-5/row, >5/row; intercostal solitary. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 3*d,e*).

SILICA BODIES.—Costal and intercostal dumbbell, ends straight to concave, middle narrow, long (Plate 3*d*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, long; apex tapered (Plate 3*f*).

MACROHAIRS.—Common to abundant; intercostal; basal cells markedly raised. There are two sizes of macrohairs, large, intercostal ones that appear infrequently and small ones that are abundant on raised intercostal ridges (Plate 3*a,c*).

ADAXIAL

STOMATA.—Common; low-dome or sometimes collapsed and appearing parallel; 2-3 stomatal bands/intercostal zone, 1 row/band (Plate 4*b,d*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends straight to convex; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 4*c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 4*c*).

PRICKLES.—Common; costal and intercostal prickles (Plate 4*c,d*).

SHORT CELLS.—Costal paired, 3-5/row, >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 4*d*).

SILICA BODIES.—Costal dumbbell, ends concave to straight, middle narrow, long or short; intercostal not seen (Plate 4*d*).

MICROHAIRS.—Abundant; two-celled; basal and apical equal in length, long; apex tapered (Plate 4*e*).

MACROHAIRS.—Abundant; intercostal; basal cells markedly raised. There are two sizes of macrohairs, large, intercostal ones that appear infrequently and small ones that are abundant on raised intercostal ridges (Plate 4*a,f*).

Loudetia arundinacea (A. Richard) Steudel

PLATES 5-6

ABAXIAL

STOMATA.—Abundant; low-dome; 3 or 4 stomatal bands/intercostal zone, 1 row/band (Plate 5*a,b*).

INTERSTOMATAL CELLS.—Square, rectangular; ends straight to slightly concave; nonsinuous. *Papillae*: None or 1/cell, globose, uniform. Sometimes the interstomatal cell is raised to resemble a papilla. Sometimes there are several interstomatal cells between stomata (Plate 5*b,c*).

LONG CELLS.—Square, rectangular; nonsinuous (?). *Papillae*: None seen (Plate 5*a,c*).

PRICKLES.—Infrequent to common; costal prickles; intercostal hooks (Plate 5*a,d*).

SHORT CELLS.—Costal 3-5/row or >5/row; intercostal solitary (cork cells only). *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal common (Plate 5*a,d*).

SILICA BODIES.—Costal dumbbell, ends straight, middle short and narrow; intercostal not seen (Plate 5*d*).

MICROHAIRS.—Abundant; two-celled; basal and apical equal in length, medium or basal

longer, apical slightly shorter; apex rounded (Plate 5e).

MACROHAIRS.—Infrequent; intercostal; basal cells markedly raised (Plate 5f).

ADAXIAL

STOMATA.—Abundant; low-dome; 1 stomatal band/intercostal zone, 1 or 2 rows/band (Plate 6a,b).

INTERSTOMATAL CELLS.—Rectangular; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 6a).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None or 1/cell, globose, uniform. *Papillae* when present are on the long cells adjacent to the stomata and opposite the stomata (Plate 6a,b).

PRICKLES.—Abundant; costal and intercostal prickles; intercostal hooks (Plate 6c,f).

SHORT CELLS.—Costal paired, 3–5/row or >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal not seen (Plate 6d,e).

SILICA BODIES.—Costal and intercostal dumbbell, ends rounded, middle short and narrow (Plate 6d,e).

MICROHAIRS.—Abundant; two-celled; basal and apical equal in length, medium to basal longer, apical slightly shorter; apex rounded (Plate 6e).

MACROHAIRS.—Infrequent; intercostal; basal cells markedly raised (Plate 6f).

Trichopteryx stolziana Henrard

PLATES 7–8

ABAXIAL

STOMATA.—Abundant; triangular; 4–7 stomatal band/intercostal zone, 1 or 2 rows/band (Plate 7b,c).

INTERSTOMATAL CELLS.—Rectangular; ends markedly concave; slightly sinuous. *Papillae*: None seen (Plate 7c).

LONG CELLS.—Rectangular, long narrow, width uniform; slightly sinuous. *Papillae*: None seen (Plate 7c).

PRICKLES.—Infrequent, marginal prickles.

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 7d).

SILICA BODIES.—Costal dumbbell, ends straight, middle narrow, long or short; intercostal not seen. Silica cells are sometimes adjacent to each other (Plate 7d).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 7e).

MACROHAIRS.—Abundant; intercostal; basal cells slightly raised (Plate 7a,f).

ADAXIAL

STOMATA.—Abundant; high-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 8a,b).

INTERSTOMATAL CELLS.—Rectangular; ends straight to convex; nonsinuous. *Papillae*: None seen (Plate 8c).

LONG CELLS.—Rectangular; nonsinuous. *Papillae*: None seen (Plate 8c).

PRICKLES.—Infrequent; marginal prickles.

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 8d).

SILICA BODIES.—Costal dumbbell, ends straight, middle narrow and short, nodular; intercostal not seen. Silica cells are sometimes adjacent (Plate 8d).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, medium; apex tapered. Both cells are collapsed (Plate 8e).

MACROHAIRS.—Common; intercostal; basal cells slightly raised. There are two sizes of macrohairs (Plate 8f).

Tristachya bequaertii De Wildeman

PLATES 9–10

ABAXIAL

STOMATA.—None seen.

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 9b,c).

PRICKLES.—Abundant; costal and intercostal prickles, intercostal hooks (Plate 9a,c,d).

SHORT CELLS.—Costal solitary, paired, 3–5/row, >5/row; intercostal solitary, paired. *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal and intercostal common (Plate 9b,d,e).

SILICA BODIES.—Costal dumbbell, ends rounded or concave, middle short, narrow; intercostal tall and narrow, elliptical (?), cross-shaped (Plate 9d,e).

MICROHAIRS.—Common to abundant; two-celled; basal and apical equal in length, long; apex tapered (Plate 9b,e,f).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Abundant; high-dome; 2–3 stomatal bands/intercostal zone, 1–2 rows/band. Subsidiary cells appear deflated perhaps because of thin walls (Plate 10b).

INTERSTOMATAL CELLS.—Square to occasionally rectangular; ends straight to convex; nonsinuous (?) (Plate 10b,c).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen. Intercostal zone is very narrow, swollen, and lacks cellular detail. Papillate-type prickles occur in intercostal zone (Plate 10c,d).

PRICKLES.—Abundant; costal prickles; intercostal prickles, hooks, short macrohairs, and papillate-type prickles (Plate 10a,d,f).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary (cork cells only). *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal infrequent. Cork cells occur adjacent to prickles (Plate 10d,e).

SILICA BODIES.—Costal dumbbell, ends straight to rounded or sometimes lobed, middle short, narrow; intercostal not seen (Plate 10e).

MICROHAIRS.—None seen.

MACROHAIRS.—Infrequent; intercostal; short macrohairs. See Prickles (Plate 10f).

Zonotriche inamoena (K. Schumann)

W.D. Clayton

PLATES 11–12

ABAXIAL

STOMATA.—Infrequent to common; parallel to low-dome; 1 stomatal band/intercostal zone, 1 or sometimes 2 rows/band (Plate 11b,c).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes a short cell is interspersed between two interstomatal cells (Plate 11b,c).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 11b,f).

PRICKLES.—Common; costal prickles and intercostal hooks (Plate 11d).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary, paired. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 11e,f).

SILICA BODIES.—Costal dumbbell, ends rounded to concave, middle narrow, long; intercostal saddle-shaped, cross-shaped (Plate 11e,f).

MICROHAIRS.—None seen.

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 11a).

ADAXIAL

STOMATA.—Common; low-dome; 2 (?) stomatal bands/intercostal zone, 1 row/band. Stomata are sunken in intercostal grooves (Plate 12a,b,c).

INTERSTOMATAL CELLS.—Rectangular, long, narrow, width uniform; ends slightly concave; slightly sinuous. *Papillae*: None seen (Plate 12c).

LONG CELLS.—Long, narrow, width uniform; slightly sinuous. *Papillae*: None seen (Plate 12c,f).

PRICKLES.—Abundant; costal prickles; intercostal prickles and hooks (Plate 12d,f).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 12d,e).

SILICA BODIES.—Costal dumbbell, ends straight, middle narrow, long or short; intercostal not seen (Plate 12*d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical much longer; apex tapered. Apical cells are usually deflated, basal cells sometimes deflated (Plate 12*f*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 12*a*).

Tribe ISACHNEAE

Coelachne africana Pilger

PLATES 13-14

ABAXIAL

STOMATA.—Infrequent to common; low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 13*a,b*).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex; nonsinuous. *Papillae*: 1/cell, globose, uniform. Papillae appear thin-walled and are usually deflated. There are often 2 or 3 interstomatal cells between stomata (Plate 13*b*).

LONG CELLS.—Square to rectangular to pentagonal; nonsinuous. *Papillae*: 1/cell, globose, uniform. Papillae are probably thin-walled and are usually deflated (Plate 13*c,d*).

PRICKLES.—Infrequent to abundant; intercostal prickles and short macrohairs (Plate 13*d*).

SHORT CELLS.—Costal >5 /row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 13*e*).

SILICA BODIES.—Costal acutely-angled; intercostal not seen (Plate 13*e*).

MICROHAIRS.—None seen. Microhairs are perhaps difficult to distinguish from papillae.

MACROHAIRS.—Infrequent to abundant; intercostal; basal cells markedly raised or absent (short macrohairs). See Prickles (Plate 13*f*).

ADAXIAL

STOMATA.—Infrequent; low-dome; 2 stomatal bands/intercostal zone, 2 or sometimes 1 row/

band. Distribution is difficult to determine because stomata may be obscured in grooves (Plate 14*b*).

INTERSTOMATAL CELLS.—Square to pentagonal; ends straight to convex; nonsinuous. *Papillae*: 1/cell, globose, uniform. There are 2 or 3 interstomatal cells between stomata (Plate 14*b*).

LONG CELLS.—Square to rectangular to long, narrow, width uniform; nonsinuous. *Papillae*: 1/cell, globose, uniform. Papillae are apparently thin-walled, usually deflated, and are sometimes located near one end of cell (Plate 14*b,c*).

PRICKLES.—Infrequent to common; intercostal prickles and short macrohairs. Prickles have raised epidermal cells at base (Plate 14*a,f*).

SHORT CELLS.—Costal >5 /row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 14*d*).

SILICA BODIES.—Costal acutely-angled; intercostal not seen (Plate 14*d*).

MICROHAIRS.—None seen. Microhairs are perhaps difficult to distinguish from papillae.

MACROHAIRS.—See Prickles.

Heteranthoecia guineensis (Franchet) Robyns

PLATES 15-16

ABAXIAL

STOMATA.—Common; low-dome; 2 stomatal bands/intercostal zone, 2 or sometimes 1 row/band (Plate 15*b,c*).

INTERSTOMATAL CELLS.—Square, pentagonal, hexagonal; ends straight to convex; nonsinuous. *Papillae*: 1/cell, globose, uniform. Papillae are usually deflated and apparently thin-walled. There are often 2 or more interstomatal cells between stomata (Plate 15*b*).

LONG CELLS.—Square, rectangular, pentagonal, hexagonal; nonsinuous. *Papillae*: 1/cell, globose, uniform. Papillae are often deflated (Plate 15*b,c*).

PRICKLES.—Common; intercostal prickles to short macrohairs. Prickles are surrounded by raised basal cells (Plate 15*a,f*).

SHORT CELLS.—Costal >5 /row; intercostal not

seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen. Cork cells are papillate (Plate 15*d,e*).

SILICA BODIES.—Costal acutely-angled; intercostal not seen (Plate 15*d,e*).

MICROHAIRS.—None seen. Microhairs may be difficult to distinguish from papillae.

MACROHAIRS.—Common; intercostal; basal cells markedly raised. See Prickles (Plate 15*a*).

ADAXIAL

STOMATA.—Infrequent to common; low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 16*b,c*).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex; nonsinuuous. *Papillae*: 1/cell, globose, uniform. Papillae are often deflated and are sometimes located near one end of the cell. There are sometimes 2 interstomatal cells between stomata (Plate 16*c*).

LONG CELLS.—Square, rectangular, pentagonal or occasionally long, narrow, width uniform; nonsinuuous. *Papillae*: 1/cell, globose, uniform. Papillae are often deflated (Plate 16*b,c*).

PRICKLES.—Common; costal or sometimes intercostal prickles and short macrohairs. Prickles are surrounded by raised basal cells (Plate 16*a,f*).

SHORT CELLS.—Costal >5 /row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen. Cork cells are papillate (Plate 16*d,e*).

SILICA BODIES.—Costal acutely-angled; intercostal not seen (Plate 16*d,e*).

MICROHAIRS.—None seen. Microhairs may be difficult to distinguish from papillae.

MACROHAIRS.—Common; intercostal; basal cells markedly raised. See Prickles (Plate 16*f*).

Isachne buettneri Hackel

PLATES 17–18

ABAXIAL

STOMATA.—Abundant; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 row/

band. Stomatal bands adjacent to vein (Plate 17*a,b*).

INTERSTOMATAL CELLS.—Square; ends slightly concave; nonsinuuous. *Papillae*: 1/cell, globose, uniform. Papillae are apparently thin-walled, often deflated (Plate 17*b*).

LONG CELLS.—Square to rectangular; nonsinuuous. *Papillae*: 1/cell, globose, uniform. Papillae are apparently thin-walled, often deflated (Plate 17*c*).

PRICKLES.—Common; costal prickles (Plate 17*c*).

SHORT CELLS.—Costal 3–5/row, >5 /row, intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen. Some cork cells papillate (Plate 17*c,d*).

SILICA BODIES.—Costal figure-eight; intercostal not seen (Plate 17*c,d*).

MICROHAIRS.—Common; two-celled; basal longer, apical shorter to basal and apical equal in length, medium; apex tapered. Microhairs often located on veins (Plate 17*e*).

MACROHAIRS.—Abundant; intercostal. Macrohairs are arranged in a row in the midintercostal region, clustered in groups of 3 or 4 per group (Plate 17*a,f*).

ADAXIAL

STOMATA.—Infrequent; low-dome to triangular; distribution indeterminable. Stomata are too infrequent (Plate 18*b*).

INTERSTOMATAL CELLS.—Square; ends straight to convex; nonsinuuous. *Papillae*: None seen (Plate 18*b*).

LONG CELLS.—Pentagonal, hexagonal; nonsinuuous. *Papillae*: None seen (Plate 18*c*).

PRICKLES.—Infrequent; costal short macrohairs (Plate 18*f*).

SHORT CELLS.—Costal >5 /row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 18*d*).

SILICA BODIES.—Costal figure-eight; intercostal not seen (Plate 18*d*).

MICROHAIRS.—Common; two-celled; basal

longer, apical shorter to basal and apical equal in length, medium; apex tapered (?), usually deflated (Plate 18*e*).

MACROHAIRS.—Infrequent; costal; basal cells markedly raised. Short macrohairs. See Prickles (Plate 18*f*).

Tribe PANICEAE

Acritochaete volkensis Pilger

PLATES 19–20

ABAXIAL

STOMATA.—Abundant; high-dome; 2 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 19*b,c*).

INTERSTOMATAL CELLS.—Square; ends straight to convex; nonsinuuous. *Papillae*: 1/cell, globose, uniform. Papillae often deflated. Often 2 interstomatal cells between stomata (Plate 19*c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None (on midvein) or 1/cell, globose, uniform. Papillae often deflated and located near one end of cell (Plate 19*c,e*).

PRICKLES.—Infrequent; intercostal prickles (Plate 19*f*).

SHORT CELLS.—Costal >5/row, paired, 3–5/row (midvein only); intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen. Cork cells usually papillate (Plate 19*d,e*).

SILICA BODIES.—Costal nodular, dumbbell, ends straight, middle wide, short; intercostal not seen (Plate 19*d,e*).

MICROHAIRS.—Infrequent; two-celled; basal shorter, apical longer; apex rounded (Plate 19*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 19*a,f*).

ADAXIAL

STOMATA.—Abundant; high-dome; 2 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 20*b,c*).

INTERSTOMATAL CELLS.—Square to rectangular to pentagonal; ends straight to convex; markedly sinuous, interlocking, raised. *Papillae*: 1/cell, globose, uniform. Papillae often deflated. Often 2 interstomatal cells between stomata (Plate 20*c*).

LONG CELLS.—Rectangular to pentagonal to hexagonal; markedly sinuous, interlocking, raised. *Papillae*: None or 1/cell, globose, uniform. Papillae often deflated and located near one end of cell (Plate 20*c,d,e*).

PRICKLES.—Infrequent; intercostal and marginal prickles (Plate 20*b,e*).

SHORT CELLS.—Costal >5/row, paired on midvein and margins; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen. Cork cells usually papillate (Plate 20*c,d,e*).

SILICA BODIES.—Costal nodular, dumbbell, ends concave, middle narrow, short, and cross-shaped on margins and midvein; intercostal not seen (Plate 20*c,d,e*).

MICROHAIRS.—Infrequent; two-celled; basal shorter, apical longer; apex rounded. Microhairs only seen in marginal areas (Plate 20*f*).

MACROHAIRS.—Short macrohairs abundant; intercostal; basal cells markedly raised (Plate 20*a*).

Acroceras zizanioides (Kunth) Dandy

PLATES 21–22

ABAXIAL

STOMATA.—Abundant; parallel to low-dome; 1 or sometimes 2 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 21*b,c*).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex or slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 21*c,e*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 21*a,c,e*).

PRICKLES.—None seen.

SHORT CELLS.—Costal >5 /row; intercostal solitary, paired. *Silica Cells*: Costal and intercostal abundant. *Cork Cells*: Costal abundant; intercostal common (Plate 21*d,e*).

SILICA BODIES.—Costal dumbbell, ends straight, middle narrow, short; intercostal cross-shaped, crenate-vertical (Plate 21*b,d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex rounded (Plate 21*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Infrequent to common; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 row/band (Plate 22*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 22*c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 22*a,c*).

PRICKLES.—Infrequent; marginal prickles (Plate 22*e*).

SHORT CELLS.—Costal >5 /row; intercostal solitary; paired. *Silica Cells*: Costal common; intercostal abundant. *Cork Cells*: Costal and intercostal common (Plate 22*c,d*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends straight, middle narrow, wide; intercostal cross-shaped, crenate-vertical (Plate 22*c,d*).

MICROHAIRS.—Common, two-celled; basal shorter, apical longer; apex rounded (Plate 22*f*).

MACROHAIRS.—None seen.

Alloteropsis angusta Stapf

PLATES 23–24

ABAXIAL

STOMATA.—Abundant; low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 23*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly to markedly concave; markedly sinuous,

interlocking, raised. *Papillae*: None seen (Plate 23*a,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 23*c*).

PRICKLES.—Common; intercostal prickles (Plate 23*d*).

SHORT CELLS.—Costal >5 /row; intercostal solitary (*silica cell* only), paired (sometimes paired *silica cells*). *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 23*d,e*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends concave, middle wide, short; intercostal cross-shaped or nodular (Plate 23*d,e*).

MICROHAIRS.—Infrequent; two-celled; basal shorter, apical longer; apex tapered (Plate 23*e*).

MACROHAIRS.—Abundant; intercostal; basal cells markedly raised (Plate 23*a,f*).

ADAXIAL

STOMATA.—Abundant; high-dome or sometimes triangular; 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 24*b*).

INTERSTOMATAL CELLS.—Rectangular; ends straight to slightly concave; nonsinuous. *Papillae*: None seen (Plate 24*b,c*).

Long Cells.—Rectangular to long, narrow, width uniform; nonsinuous. *Papillae*: None seen (Plate 24*a,c*).

PRICKLES.—Infrequent to common; costal and intercostal hooks. Sometimes there is a single cork cell adjacent to hook (Plate 24*d,e*).

SHORT CELLS.—Costal >5 /row (sometimes a row of adjacent *silica cells*); intercostal solitary (*cork cell* only). *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal common (Plate 24*d,e*).

SILICA BODIES.—Costal cross-shaped, nodular, dumbbell, ends concave, middle narrow, short; intercostal not seen (Plate 24*d,e*).

MICROHAIRS.—Infrequent; two-celled; basal and apical equal in length, medium; apex tapered (Plate 24*f*).

MACROHAIRS.—None seen.

Anthephora elongata De Wildeman

PLATES 25-26

ABAXIAL

STOMATA.—Infrequent; low-dome to triangular; distribution indeterminable. Stomata are seen only near the margins (Plate 25*b*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, flat. *Papillae*: None seen (Plate 25*b,c*).

PRICKLES.—Common; costal and intercostal prickles (Plate 25*c,d*).

SHORT CELLS.—Costal 3-5/row, >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 25*d*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends straight, middle wide, short; intercostal not seen (Plate 25*d*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, medium; apex tapered (Plate 25*e*).

MACROHAIRS.—Abundant; intercostal; basal cells markedly raised (Plate 25*a,f*).

ADAXIAL

STOMATA.—Common; low-dome; 2 (?) stomatal bands/intercostal zone, 1 row/band. Distribution is hard to determine because of a large number of hairs and folded cells. Costal areas are indistinct (Plate 26*b,c*).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex (?); nonsinuous (?). *Papillae*: None seen. Sometimes there are 2 interstomatal cells between stomata (Plate 26*b,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 26*c,e*).

PRICKLES.—Abundant; costal and intercostal prickles (Plate 26*c,f*).

SHORT CELLS.—Costal solitary, 3-5/row; intercostal not seen. *Silica Cells*: Costal infrequent; intercostal not seen. *Cork Cells*: Costal infrequent; intercostal not seen (Plate 26*d,f*).

SILICA BODIES.—Costal nodular, dumbbell, ends straight, middle wide, short and long, narrow; intercostal not seen (Plate 26*d,f*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex tapered (Plate 26*e*).

MACROHAIRS.—Abundant; intercostal and costal; basal cells markedly raised (Plate 26*a,f*).

Axonopus flexuosus (Peter) Troupin

PLATES 27-28

ABAXIAL

STOMATA.—Abundant; triangular; 4 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 27*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes 2 interstomatal cells between stomata (Plate 27*c,e*).

LONG CELLS.—Rectangular; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 27*a,c*).

PRICKLES.—Common; intercostal prickles and hooks (Plate 27*e*).

SHORT CELLS.—Costal paired, >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 27*d,e*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends concave, middle wide, short; intercostal not seen (Plate 27*d,e*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 27*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Abundant; triangular; 3 to 4 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 28*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 28*c*).

LONG CELLS.—Rectangular; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 28*a,c*).

PRICKLES.—Common; marginal prickles, intercostal prickles and hooks (Plate 28*e*).

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 28*d*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends concave, middle wide, short; intercostal not seen (Plate 28*d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 28*f*).

MACROHAIRS.—None seen.

Brachiaria brizantha (A. Richard) Stapf

PLATES 29–30

ABAXIAL

STOMATA.—Common; low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 29*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly or sometimes markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes 2 interstomatal cells or 2 interstomatal cells and a short cell between stomata (Plate 29*c,d*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 29*c,e*).

PRICKLES.—Common; intercostal hooks, marginal prickles and short macrohairs (Plate 29*d,e*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal abundant; intercostal common, abundant near margins. *Cork Cells*: Costal abundant; intercostal infrequent, abundant near margins (Plate 29*d,e*).

SILICA BODIES.—Costal dumbbell, ends concave, middle wide, short or rarely nodular; intercostal cross-shaped (Plate 29*d,e*).

MICROHAIRS.—Common; two-celled; basal

shorter, apical longer to basal and apical equal in length, long; apex tapered(?) (Plate 29*e*).

MACROHAIRS.—Infrequent; intercostal; basal cells slightly raised (Plate 29*f*).

ADAXIAL

STOMATA.—Common; low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 30*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes 2 interstomatal cells or 2 interstomatal cells and a short cell between stomata (Plate 30*c,d*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 30*c*).

PRICKLES.—Common; intercostal hooks, marginal prickles and short macrohairs (Plate 30*b*).

SHORT CELLS.—Costal >5/row; intercostal solitary, paired. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 30*c,d*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends rounded, middle wide, short or rarely nodular; intercostal cross-shaped (Plate 30*c,d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex tapered(?) (Plate 30*e*).

MACROHAIRS.—Infrequent; intercostal; basal cells slightly raised (Plate 30*f*).

Cenchrus ciliaris Linnaeus

PLATES 31–32

ABAXIAL

STOMATA.—Abundant; low-dome; 1 stomatal band/intercostal zone, 1 row/band (Plate 31*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 31*b,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 31*a,c*).

PRICKLES.—Common; costal and intercostal prickles (Plate 31*d*).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal common (Plate 31*d,e*).

SILICA BODIES.—Costal dumbbell, ends rounded, middle narrow, short; intercostal crenate-vertical, cross-shaped (Plate 31*d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 31*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common; low-dome to triangular; 2 or sometimes 3 stomatal bands/intercostal zone, 1 row/band (Plate 32*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes 2 interstomatal cells or 2 interstomatal cells and a short cell between stomata (Plate 32*a,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 32*c*).

PRICKLES.—Common; costal prickles; intercostal hooks (Plate 32*c,d,e*).

SHORT CELLS.—Costal 3–5/row, >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal common (Plate 32*d,e*).

SILICA BODIES.—Costal dumbbell, ends rounded, middle narrow, short; intercostal cross-shaped, crenate-vertical (Plate 32*d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 32*d*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 32*f*).

Chaetopoa taylori C.E. Hubbard

PLATES 33–34

ABAXIAL

STOMATA.—Abundant; triangular to high-dome; 2 or sometimes 3 stomatal bands/intercostal zone, 1 row/band. Shape of subsidiary cell hard to determine because of collapsed cells (Plate 33*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 33*c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 33*a,c*).

PRICKLES.—Common; costal prickles and short macrohairs (Plate 33*d,e*).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary, paired (marginal areas only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal infrequent (Plate 33*d,e*).

SILICA BODIES.—Costal cross-shaped (marginal areas only), dumbbell, ends concave, middle narrow, long and wide, short; intercostal not seen (Plate 33*d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 33*f*).

MACROHAIRS.—Abundant; intercostal; basal cells markedly raised (Plate 33*e*).

ADAXIAL

STOMATA.—Infrequent; high-dome; distribution indeterminable. Stomata occur in marginal area only (Plate 34*b*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 34*b,c*).

PRICKLES.—Common; costal prickles and short macrohairs, intercostal hooks (Plate 34*e*).

SHORT CELLS.—Costal solitary, paired, 3–5/row; intercostal solitary (silica cells only). *Silica*

Cells: Costal and intercostal infrequent. *Cork Cells*: Costal infrequent; intercostal not seen (Plate 34 *c,d*).

SILICA BODIES.—Costal dumbbell, ends concave, middle wide, short to rarely nodular; intercostal cross-shaped (Plate 34 *d*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 34 *f*).

MACROHAIRS.—Abundant; intercostal; basal cells slightly or markedly raised. Two sizes of macrohairs are present; the smaller ones have slightly raised basal cells (Plate 34 *a,e*).

Chloachne oplismenoides (Hackel) Robyns

PLATES 35–36

ABAXIAL

STOMATA.—Common; parallel to low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 35 *b,c*).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex; markedly sinuous, interlocking, raised (?). *Papillae*: None seen (Plate 35 *d*).

LONG CELLS.—Square, rectangular, sometimes pentagonal; slightly sinuous. *Papillae*: None seen (Plate 35 *a,c*).

PRICKLES.—Infrequent; prickles on midvein and margins only, intercostal short macrohairs (Plate 35 *a,e*).

SHORT CELLS.—Costal >5/row, 3–5/row (midvein only), paired (midvein only), solitary (midvein, cork cells only); intercostal solitary (silica cells only). *Silica Cells*: Costal and intercostal common. *Cork Cells*: Costal common; intercostal not seen (Plate 35 *d,e*).

SILICA BODIES.—Costal nodular, dumbbell, ends rounded or concave, middle narrow, short; intercostal cross-shaped, crenate-vertical (Plate 35 *d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 35 *f*).

MACROHAIRS.—Abundant; intercostal; basal

cells markedly raised. There are two sizes of macrohairs present (Plate 35 *a,e*).

ADAXIAL

STOMATA.—Common; low-dome, high-dome (margins only); 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 36 *b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes more than one interstomatal cell between stomata (Plate 36 *a,b*).

LONG CELLS.—Square, rectangular, pentagonal, hexagonal, long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 36 *a,d*).

PRICKLES.—Infrequent to common; costal and intercostal prickles (Plate 36 *a–c*).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal infrequent (Plate 36 *c,d*).

SILICA BODIES.—Costal nodular, dumbbell, ends straight to concave, middle narrow, short; intercostal crenate-vertical, cross-shaped (Plate 36 *c,d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 36 *e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 36 *f*).

Chlorocalymma cryptacanthum W.D. Clayton

PLATES 37–38

ABAXIAL

STOMATA.—Abundant; low-dome to triangular to high-dome; 2 or sometimes 4 stomatal bands/intercostal zone, 1 row/band (Plate 37 *b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly concave; slightly sinuous. *Papillae*: None seen (Plate 37 *b,c*).

LONG CELLS.—Rectangular to long, narrow,

width uniform; slightly sinuous. *Papillae*: None seen (Plate 37*a,c*).

PRICKLES.—Abundant; costal and intercostal prickles (Plate 37*a,c*).

SHORT CELLS.—Costal >5 /row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 37*d*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends rounded, middle wide, short; intercostal not seen (Plate 37*d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 37*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 37*f*).

ADAXIAL

STOMATA.—Abundant; low-dome to high-dome; 6, 8, or 10 stomatal bands/intercostal zone, 1 row/band (Plate 38*a,b*).

INTERSTOMATAL CELLS.—Square to rectangular to long, narrow, width uniform; ends slightly concave; slightly sinuous. *Papillae*: None seen. Sometimes 2 interstomatal cells or 2 interstomatal cells and a prickle between stomata (Plate 38*b,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; slightly sinuous. *Papillae*: None seen (Plate 38*b,d*).

PRICKLES.—Common; costal and intercostal prickles (Plate 38*a,c*).

SHORT CELLS.—Costal paired, 3–5/row, >5 /row; intercostal solitary. *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal infrequent. Intercostal cork cell sometimes adjacent to a prickle (Plate 38*c,d*).

SILICA BODIES.—Costal cross-shaped; intercostal cross-shaped to dumbbell, ends concave, middle wide, short (Plate 38*c,d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 38*e*).

MACROHAIRS.—Common; intercostal; basal cells slightly to markedly raised (Plate 38*f*).

Cyrtococcum multinode (Lamarck)

W.D. Clayton

PLATES 39–40

ABAXIAL

STOMATA.—Common; low-dome to triangular to high-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 39*b*).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex; nonsinuous. *Papillae*: 1/cell; globose (?); uniform. *Papillae* are usually deflated. Sometimes there are 2 interstomatal cells between stomata (Plate 39*b*).

LONG CELLS.—Rectangular to long, narrow, width uniform; nonsinuous. *Papillae*: 1/cell; globose (?); uniform. *Papillae* are often deflated. Outline of cell is difficult to determine because of collapsed cells (Plate 39*a,c*).

PRICKLES.—Infrequent; costal prickles; intercostal hooks (Plate 39*a,c*).

SHORT CELLS.—Costal 3–5/row, >5 /row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen. Cork cells are sometimes papillate (Plate 39*d*).

SILICA BODIES.—Costal square, elongated-smooth; intercostal not seen. Silica bodies are sometimes lobed on the end (Plate 39*b,d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded. Sometimes the apical cell has a swollen papillate tip (Plate 39*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised. There are two sizes of macrohairs present (Plate 39*c,f*).

ADAXIAL

STOMATA.—Infrequent; low-dome; distribution indeterminable because only a few stomata seen near the margins and on the midvein (Plate 40*b,c*).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends straight to convex; mark-

edly sinuous, interlocking, raised. *Papillae*: None seen (Plate 40*b,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None or 1/cell, globose, uniform (Plate 40*a,c*).

PRICKLES.—Common; costal prickles; intercostal hooks and short macrohairs (Plate 40*a,d*).

SHORT CELLS.—Costal solitary, paired, 3–5/row, >5/row, intercostal not seen. *Silica Cells*: Costal infrequent; intercostal not seen. *Cork Cells*: Costal infrequent; intercostal not seen (Plate 40*d*).

SILICA BODIES.—Costal elongated-smooth; intercostal not seen (Plate 40*d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 40*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 40*f*).

***Digitaria diagonalis* (Nees) Stapf
var. *uniglumis* (A. Richard) Pilger**

PLATES 41–42

ABAXIAL

STOMATA.—Common; triangular; 1 or 2 stomatal bands/intercostal zone; 1 row/band (Plate 41*a,b*).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 41*a,b*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 41*b,c*).

PRICKLES.—Infrequent; prickles only seen near margin (Plate 41*c*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 41*d,e*).

SILICA BODIES.—Costal dumbbell, ends rounded, middle wide, short, to cross-shaped;

intercostal cross-shaped, dumbbell, ends rounded, middle wide, short (Plate 41*d,e*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex tapered (Plate 41*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common; low-dome to high-dome; 1 or 2 stomatal bands/intercostal zone; 1 row/band (Plate 42*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform to nonuniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 42*b,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 42*a,c*).

PRICKLES.—Common; costal prickles; infrequent intercostal hooks (Plate 42*d,f*).

SHORT CELLS.—Costal 3–5/row, >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal not seen (Plate 42*d,e*).

SILICA BODIES.—Costal nodular, dumbbell, ends concave, middle wide, short; intercostal dumbbell, ends concave, middle wide, short. Sometimes silica bodies are adjacent (Plate 42*d,e*).

MICROHAIRS.—Common to abundant; two-celled; basal and apical equal in length, medium; apex rounded or basal shorter, apical slightly longer; apex tapered (Plate 42*f*).

MACROHAIRS.—None seen.

***Eccoptocarpha obconiciventris* Launert**

PLATES 43–44

ABAXIAL

STOMATA.—Abundant; low-dome; 1 or 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (?). Intercostal zones difficult to determine (Plate 43*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 43*c,d*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 43*a,d*).

PRICKLES.—None seen.

SHORT CELLS.—Costal and intercostal solitary, paired. *Silica Cells*: Costal and intercostal abundant. *Cork Cells*: Costal and intercostal infrequent (Plate 43*d,e*).

SILICA BODIES.—Costal cross-shaped to dumbbell, ends concave, middle wide, short; intercostal cross-shaped, crenate-vertical (Plate 43*d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 43*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Abundant; low-dome; 2 or 3 stomatal bands/intercostal zone, 1 row/band (Plate 44*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 44*b,c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 44*a,c*).

PRICKLES.—None seen.

SHORT CELLS.—Costal solitary, 3–5/row, >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal and intercostal common. *Cork Cells*: Costal common, intercostal infrequent (Plate 44*c,d*).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends concave, middle narrow, short; intercostal crenate-vertical, cross-shaped (Plate 44*c,d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex tapered (Plate 44*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 44*f*).

Echinochloa haploclada (Stapf) Stapf

PLATES 45–46

ABAXIAL

STOMATA.—Abundant; low-dome or sometimes triangular; 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 45*a,b*).

INTERSTOMATAL CELLS.—Square, rectangular; ends straight to convex to slightly concave; markedly sinuous, interlocking, raised (?). *Papillae*: 1/cell, globose, uniform. Sometimes there are 2 or 3 interstomatal between stomata (Plate 45*c,f*).

LONG CELLS.—Rectangular, long, narrow, width nonuniform (slightly wider in middle). *Papillae*: 1/cell, globose, uniform (Plate 45*c,d*).

PRICKLES.—Infrequent; costal prickles on midvein and veins near margin, rarely intercostal short macrohairs (Plate 45*a,f*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal not seen. Cork cells are papillate (Plate 45*d*).

SILICA BODIES.—Costal dumbbell, ends straight or slightly lobed, middle wide, short or sometimes nodular; intercostal cross-shaped (Plate 45*d*).

MICROHAIRS.—Infrequent; two-celled; basal slightly longer, apical slightly shorter; apex rounded (?) (Plate 45*e*).

MACROHAIRS.—Infrequent; intercostal; basal cells slightly raised. Short macrohairs. See Prickles (Plate 45*f*).

ADAXIAL

STOMATA.—Common; low-dome; 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 46*b,c*).

INTERSTOMATAL CELLS.—Square, rectangular; ends straight to convex; markedly sinuous, interlocking, raised (?). *Papillae*: 1/cell, globose, uniform. Sometimes there are 2 or more interstomatal between stomata (Plate 46*c*).

LONG CELLS.—Rectangular, long, narrow, width nonuniform (middle slightly wider) or sometimes square; markedly sinuous, interlocking, raised (?). *Papillae*: 1/cell, globose, uniform (Plate 46*c,d*).

PRICKLES.—Infrequent; mainly on margin but rarely costal and intercostal prickles (Plate 46*a*).

SHORT CELLS.—Costal >5/row; intercostal paired. *Silica Cells*: Costal common to abundant; intercostal infrequent. *Cork Cells*: Costal common to abundant; intercostal infrequent. *Cork Cells* are papillate (Plate 46*d,e*).

SILICA BODIES.—Costal dumbbell, ends rounded, straight or lobed, middle wide, short (Plate 46*d,e*).

MICROHAIRS.—Common; two-celled; basal slightly longer, apical slightly shorter; apex rounded (?). Apical cell is usually deflated (Plate 46*f*).

MACROHAIRS.—Common to abundant; intercostal; basal cells slightly to markedly raised. There is a large number of raised cells (Plate 46*a*).

Entolasia imbricata Stapf

PLATES 47–48

ABAXIAL

STOMATA.—Common to abundant; low-dome to triangular; 2 stomatal bands/intercostal zone, 2 or sometimes 1 row/band (Plate 47*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 47*c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 47*c,d*).

PRICKLES.—Infrequent to common; intercostal prickles. Prickles are often obscured in intercostal groove (Plate 47*c*).

SHORT CELLS.—Costal >5/row; intercostal solitary. *Silica Cells*: Costal abundant; intercostal

infrequent. *Cork Cells*: Costal abundant; intercostal infrequent to common (Plate 47*c,d*).

SILICA BODIES.—Costal dumbbell, ends straight or lobed, middle wide, short; intercostal cross-shaped (Plate 47*d*).

MICROHAIRS.—Infrequent; two-celled; basal shorter, apical slightly longer; apex tapered (Plate 47*e*).

MACROHAIRS.—Common to abundant; intercostal; basal cells markedly raised (Plate 47*f*).

ADAXIAL

STOMATA.—Common; low-dome to triangular; 2 stomatal bands/intercostal zone, 2 or sometimes 4 rows/band (Plate 48*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 48*a*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 48*d*).

PRICKLES.—Common; intercostal prickles (Plate 48*c*).

SHORT CELLS.—Costal >5/row; intercostal paired. *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal common (Plate 48*c,d*).

SILICA BODIES.—Costal dumbbell, ends straight or lobed, middle wide, long or short; intercostal cross-shaped, dumbbell, ends straight or lobed, middle wide, short (Plate 48*c,d*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 48*e*).

MACROHAIRS.—Common; costal and intercostal; basal cells markedly raised (Plate 48*f*).

Eriochloa meyerana (Nees) Pilger

PLATES 49–50

ABAXIAL

STOMATA.—Common to abundant; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 row/band (Plate 49*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends straight to convex or slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes there are 2 interstomatal cells and a cork cell between stomata (Plate 49*a,b*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 49*b,e*).

PRICKLES.—Infrequent to common; intercostal hooks and sometimes prickles (Plate 49*e*).

SHORT CELLS.—Costal >5/row; intercostal solitary (cork cells only), paired. *Silica Cells*: Costal and intercostal common. *Cork Cells*: Costal common; intercostal abundant (Plate 49*b,d,e*).

SILICA BODIES.—Costal nodular, dumbbell, ends straight or lobed, middle wide, short or long; intercostal cross-shaped to square (Plate 49*b,d*).

MICROHAIRS.—Common; two-celled; basal longer, apical shorter; apex tapered (Plate 49*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common to abundant; low-dome to triangular; 2 or sometimes 3 or 4 stomatal bands/intercostal zone, 1 row/band. Subsidiary cells are often collapsed (Plate 50*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends straight to convex; nonsinuous (may be an artifact of collapsed cells). *Papillae*: None seen. Sometimes there are 2 interstomatal cells and a cork cell (or prickle) between the stomata (Plate 50*c*).

LONG CELLS.—Long, narrow, width uniform (?), nonsinuous (?). *Papillae*: None seen. It is very difficult to determine shape and outline because of collapsed cells (Plate 50*a,d*).

PRICKLES.—Common; intercostal prickles and hooks (Plate 50*c*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal not seen (Plate 50*d,e*).

SILICA BODIES.—Costal nodular or dumbbell,

ends lobed or sometimes straight, middle wide, long or short; intercostal cross-shaped (Plate 50*d,e*).

MICROHAIRS.—Common; two-celled; basal longer, apical shorter; apex tapered (?). Apical cell is usually deflated (Plate 50*f*).

MACROHAIRS.—None seen.

Holcolemma inaequale W.D. Clayton

PLATES 51–52

ABAXIAL

STOMATA.—Abundant; low-dome to triangular; 2 or 3 stomatal bands/intercostal zone, 1 row/band (Plate 51*a,b*).

INTERSTOMATAL CELLS.—Rectangular, long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 51*b*).

LONG CELLS.—Rectangular, long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 51*c*).

PRICKLES.—Infrequent; marginal, costal and intercostal prickles (Plate 51*c*).

SHORT CELLS.—Costal 3–5/row, >5/row; intercostal solitary. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 51*d,f*).

SILICA BODIES.—Costal dumbbell, ends straight, middle narrow and short or wide and short; intercostal cross-shaped. Silica cells are sometimes adjacent to each other (Plate 51*d,f*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 51*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 51*f*).

ADAXIAL

STOMATA.—Common; low-dome to high-dome; 2 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 52*a,b*).

INTERSTOMATAL CELLS.—Rectangular, long, narrow, width uniform or nonuniform (wider in middle); ends straight to convex; nonsinuous. *Papillae*: None seen (Plate 52*c*).

LONG CELLS.—Pentagonal, long, narrow, width nonuniform (wider in middle); nonsinuous. *Papillae*: None seen (Plate 52a,e).

PRICKLES.—Infrequent to common; costal and intercostal prickles (Plate 52a).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal not seen (Plate 52a,d).

SILICA BODIES.—Costal dumbbell, ends straight or lobed, middle wide and short or sometimes nodular; intercostal cross-shaped. Sometimes silica cells are adjacent to each other (Plate 52a,d).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex tapered. Microhairs are often on the costal regions (Plate 52d,e).

MACROHAIRS.—Common; intercostal; basal cells slightly or markedly raised (Plate 52f).

Hylebates chlorochloe (K. Schumann) Napper

PLATES 53–54

ABAXIAL

STOMATA.—Abundant; low-dome or sometimes triangular; 2 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 53b,c).

INTERSTOMATAL CELLS.—Square to rectangular; ends slightly concave; slightly sinuous or indeterminable in most cases. *Papillae*: None seen (Plate 53c).

LONG CELLS.—Square, rectangular, long, narrow, width uniform; slightly sinuous (best seen near the margin) to markedly sinuous (on costal areas), interlocking, raised. *Papillae*: None seen (Plate 53a,d).

PRICKLES.—Common; intercostal and marginal prickles; intercostal hooks (Plate 53a,e).

SHORT CELLS.—Costal solitary (cork cells only and only on midvein), 3–5/row, >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 53c,d).

SILICA BODIES.—Costal dumbbell, ends

rounded to straight, middle wide, short; intercostal not seen (Plate 53c,d).

MICROHAIRS.—Abundant; two-celled; basal and apical equal in length, medium; apex rounded (Plate 53e).

MACROHAIRS.—Infrequent; intercostal; basal cells markedly raised (Plate 53f).

ADAXIAL

STOMATA.—Common; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 row/band (Plate 54b,c).

INTERSTOMATAL CELLS.—Long, narrow, width uniform to sometimes rectangular; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 54b,d).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 54a,c).

PRICKLES.—Abundant; costal prickles and intercostal hooks (Plate 54c).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent. Sometimes there are >5 adjacent silica cells in a row, not separated by cork cells (Plate 54d,e).

SILICA BODIES.—Costal dumbbell, ends straight, middle wide, short; intercostal cross-shaped (Plate 54d).

MICROHAIRS.—Abundant; two-celled; basal and apical equal in length, medium, or basal longer, apical shorter; apex rounded (Plate 54b).

MACROHAIRS.—Infrequent; intercostal; basal cells markedly raised (Plate 54f).

Melinis ambigua Hackel

PLATES 55–56

ABAXIAL

STOMATA.—Common; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 row/band. Interstomatal zones are very narrow and somewhat grooved (Plate 55a,b).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 55*b,e*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 55*b,d*).

PRICKLES.—Abundant; intercostal prickles and hooks (Plate 55*c,d*).

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 55*d*).

SILICA BODIES.—Costal dumbbell, ends rounded, middle wide, short; intercostal not seen (Plate 55*d*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, long or basal shorter, apical slightly longer; apex rounded (Plate 55*e*).

MACROHAIRS.—Abundant; intercostal; basal cells markedly raised. Two sizes of macrohairs are present (Plate 55*a,f*).

ADAXIAL

STOMATA.—Abundant; triangular; 8–10(?) stomatal bands/intercostal zone, 1 or sometimes 2 rows/band. Costal zone is difficult to detect (Plate 56*b,d*).

INTERSTOMATAL CELLS.—Rectangular or sometimes long, narrow, width uniform; slightly or sometimes markedly concave; slightly sinuous. *Papillae*: None seen (Plate 56*c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; slightly sinuous. *Papillae*: None seen (Plate 56*d*).

PRICKLES.—Infrequent; costal prickles (Plate 56*e*).

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal infrequent; intercostal not seen (Plate 56*f*).

SILICA BODIES.—Costal nodular; intercostal not seen (Plate 56*f*).

MICROHAIRS.—None seen.

MACROHAIRS.—None seen.

Odontelytrum abyssinicum Hackel

PLATES 57–58

ABAXIAL

STOMATA.—Abundant; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band. Costal zones are difficult to detect (Plate 57*a,b*).

INTERSTOMATAL CELLS.—Rectangular or sometimes square, long, narrow, width uniform; ends straight to convex; markedly sinuous, interlocking, raised. *Papillae*: 1, 2, 3 or more/cell, single row or irregular, globose to elongate, variable. Sometimes there seem to be 2 interstomatal cells between stomata (Plate 57*b,c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: 3 or more/cell, single row, globose to elongate, variable (Plate 57*a,c*).

PRICKLES.—None seen.

SHORT CELLS.—Costal solitary, paired, >5/row; intercostal solitary, paired. *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal infrequent. Costal cork cells are papillate (Plate 57*b,d,e*).

SILICA BODIES.—Costal cross-shaped, nodular, dumbbell, ends concave, middle wide, short; intercostal crenate-vertical (Plate 57*b,d,e*).

MICROHAIRS.—Infrequent; two-celled; basal and apical equal in length, medium to basal shorter, apical longer; apex rounded (Plate 57*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common to abundant; low-dome to triangular; 2 stomatal bands/intercostal zone, 1–2 rows/band. Costal zones are difficult to detect (Plate 58*a,b*).

INTERSTOMATAL CELLS.—Square to rectangular; ends markedly concave; markedly sinuous, interlocking, raised. *Papillae*: 1, 2, 3 or more/cell, single row, elongate or globose, variable (Plate 58*b*).

LONG CELLS.—Rectangular to long, narrow,

width uniform; markedly sinuous, interlocking, raised. *Papillae*: 1, 2, 3 or more/cell, single row, globose or elongate, variable (Plate 58c).

PRICKLES.—Infrequent; prickles costal to intercostal. Large, straight prickles without swollen bases are more or less on sides of veins (Plate 58c).

SHORT CELLS.—Costal solitary, paired; intercostal solitary, paired. *Silica Cells*: Costal and intercostal infrequent. *Cork Cells*: Costal and intercostal infrequent (Plate 58d,e).

SILICA BODIES.—Costal cross-shaped, dumbbell, ends concave, middle wide, short; intercostal crenate-vertical (Plate 58d,e).

MICROHAIRS.—Infrequent; two-celled; basal and apical equal in length, medium to basal shorter, apical longer; apex rounded (Plate 58f).

MACROHAIRS.—None seen.

Oplismenus burmanii (Retzius) P. Beauvois

PLATES 59–60

ABAXIAL

STOMATA.—Common; low-dome to triangular; 2 stomatal bands/intercostal zone, 1 row/band (Plate 59b).

INTERSTOMATAL CELLS.—Rectangular; ends markedly concave (?); slightly sinuous. Ends and outline of cells are difficult to determine because of collapsed cells. *Papillae*: None seen (Plate 59c).

LONG CELLS.—Rectangular to long, narrow, width uniform; slightly sinuous to markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 59a,c).

PRICKLES.—Infrequent; marginal prickles.

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 59c,d).

SILICA BODIES.—Costal nodular or dumbbell, ends rounded, middle wide and short; intercostal cross-shaped, crenate-vertical (Plate 59c,d).

MICROHAIRS.—Common; two-celled; basal

shorter, apical longer; apex rounded (Plate 59e).

MACROHAIRS.—Abundant; intercostal; basal cells markedly raised. Two sizes of macrohairs present (Plate 59a,f).

ADAXIAL

STOMATA.—Infrequent; low-dome; distribution indeterminable because stomata are too infrequent (Plate 60b).

INTERSTOMATAL CELLS.—Indeterminable because stomata are too infrequent.

LONG CELLS.—Rectangular to long, narrow, width uniform; slightly sinuous to markedly sinuous, interlocking, raised. *Papillae*: None or 3 or more/cell, irregular, globose. *Papillae* only on long cells adjacent to veins. Raised rectangular masses are scattered throughout intercostal long cells (Plate 60a,c).

PRICKLES.—Infrequent; costal, intercostal and marginal prickles (Plate 60d,e).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal and intercostal common. *Cork Cells*: Costal common; intercostal not seen (Plate 60d,e).

SILICA BODIES.—Costal mainly nodular or occasionally dumbbell, ends concave, middle wide and short; intercostal crenate-vertical, cross-shaped (Plate 60d,e).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 60e).

MACROHAIRS.—Common; intercostal; basal cells markedly raised. There are two sizes of macrohairs present (Plate 60f).

Panicum trichoides Swartz

PLATES 61–62

ABAXIAL

STOMATA.—Common; low-dome or sometimes triangular; 2 stomatal bands/intercostal zone, 1 row/band (Plate 61b,c).

INTERSTOMATAL CELLS.—Rectangular; ends slightly or markedly concave; slightly to markedly sinuous, interlocking, raised. *Papillae*: None

seen. There are often more than one interstomatal cell between stomata (Plate 61*c*).

LONG CELLS.—Square to rectangular; markedly to slightly sinuous, interlocking, raised. *Papillae*: None seen (Plate 61*a,d*).

PRICKLES.—Infrequent; marginal prickles only.

SHORT CELLS.—Costal >5/row; intercostal paired. *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal infrequent. There are sometimes >1 adjacent silica bodies (Plate 61*d,e*).

SILICA BODIES.—Costal nodular, dumbbell, ends straight or concave, middle narrow and short; intercostal cross-shaped (Plate 61*d,e,f*).

MICROHAIRS.—Infrequent to common; two-celled; basal and apical equal, medium, to basal shorter, apical longer; apex rounded. Apical cell very thin and deflated (Plate 61*f*).

MACROHAIRS.—Common; intercostal; basal cells slightly raised (Plate 61*a*).

ADAXIAL

STOMATA.—Common; low-dome to triangular; 2–4 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 62*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly concave; slightly sinuous. *Papillae*: None seen. Sometimes there are >1 interstomatal cells between stomata (Plate 62*c*).

LONG CELLS.—Square, rectangular, pentagonal; slightly sinuous (markedly sinuous, interlocking, raised in marginal areas). *Papillae*: None seen (Plate 62*a,c*).

PRICKLES.—Infrequent; marginal prickles only.

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 62*d*).

SILICA BODIES.—Costal nodular, dumbbell, ends straight, middle wide and short; intercostal not seen. Sometimes there are >1 silica bodies adjacent to each other (Plate 62*d*).

MICROHAIRS.—Common; two-celled; basal

shorter, apical longer; apex tapered (Plate 62*e*).

MACROHAIRS.—Common; intercostal; basal cells slightly raised (Plate 62*f*).

Paspalidium geminatum (Forsskal) Stapf

PLATES 63–64

ABAXIAL

STOMATA.—Common; triangular; 1 or 2 stomatal bands/intercostal zone, 1–2 rows/band (Plate 63*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends markedly concave; outline of walls indeterminable. *Papillae*: None seen (Plate 63*c,d*).

LONG CELLS.—Rectangular to long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 63*a,c*).

PRICKLES.—None seen.

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary (cork cells only). *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal infrequent (Plate 63*d,e*).

SILICA BODIES.—Costal cross-shaped or dumbbell, ends straight, middle wide, short; intercostal not seen (Plate 63*d,e*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, medium to basal shorter, apical slightly longer; apex tapered (Plate 63*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common to abundant; low-dome; 1 or sometimes 2 stomatal bands/intercostal zone, 2 or sometimes 1 row/band (Plate 64*a,b*).

INTERSTOMATAL CELLS.—Rectangular or sometimes square to pentagonal; ends straight to convex; nonsinuous (?). *Papillae*: 1/cell, globose to elongate, variable. *Papillae* are located near one end of cell and are often deflated. There often are 2 interstomatal cells between stomata (Plate 64*b,c*).

LONG CELLS.—Rectangular, pentagonal; non-sinuuous (?). *Papillae*: 1/cell (sometimes the papilla is deflated so as to appear absent), globose to elongate, variable. *Papillae* are often deflated and located near one end of cell (Plate 64*a,c,d*).

PRICKLES.—Infrequent; costal short macrohair-type (Plate 64*e*).

SHORT CELLS.—Costal 3–5/row, >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen. Cork cells are papillate (Plate 64*d,f*).

SILICA BODIES.—Costal dumbbell, ends rounded or straight, middle wide, short; intercostal not seen (Plate 64*f*).

MICROHAIRS.—None seen. Microhairs may be obscured by papillae.

MACROHAIRS.—See Prickles.

Paspalum conjugatum Berg

PLATES 65–66

ABAXIAL

STOMATA.—Common; low-dome to triangular; 5 stomatal bands/intercostal zone, 1 row/band (Plate 65*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, flat. *Papillae*: None seen (Plate 65*b,c*).

LONG CELLS.—Rectangular, long, narrow, width uniform; markedly sinuous, interlocking, flat. *Papillae*: None seen (Plate 65*a,c*).

PRICKLES.—Infrequent; intercostal and marginal prickles (Plate 65*f*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal not seen. Sometimes there are adjacent silica cells without cork cells between them (Plate 65*a,d*).

SILICA BODIES.—Costal narrowly saddle-shaped, unlobed, tall and narrow; intercostal crenate-vertical (Plate 65*a,d*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 65*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 65*f*).

ADAXIAL

STOMATA.—Abundant; low-dome; 2 or 3 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band. Some subsidiary cells have a pair of papillae on each cell (Plate 66*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends straight to convex; nonsinuuous. *Papillae*: None seen. Sometimes there are 2 or more interstomatal cells between stomata (Plate 66*b,c*).

LONG CELLS.—Rectangular to long, narrow, width uniform (?); nonsinuuous. *Papillae*: None seen. Shape is hard to determine because of collapsed cells (Plate 66*a,f*).

PRICKLES.—Infrequent; intercostal hooks (Plate 66*f*).

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen (Plate 66*c,d*).

SILICA BODIES.—Costal widely saddle-shaped, unlobed, tall and narrow to square; intercostal not seen (Plate 66*c,d*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 66*e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 66*f*).

Pennisetum purpureum Schumacher

PLATES 67–68

ABAXIAL

STOMATA.—Common to abundant; low-dome; 8 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 67*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 67*b*).

LONG CELLS.—Long, narrow, width uniform;

markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 67*b,d*).

PRICKLES.—Common; costal prickles; intercostal hooks (Plate 67*d*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal common; intercostal common to abundant. *Cork Cells*: Costal common; intercostal not seen (Plate 67*c,d*).

SILICA BODIES.—Costal dumbbell, ends concave, middle wide, short; intercostal cross-shaped (Plate 67*c,d*).

MICROHAIRS.—Common to abundant; two-celled; basal and apical equal in length, medium to basal shorter, apical slightly longer; apex tapered (Plate 67*e*).

MACROHAIRS.—Common to abundant; intercostal; basal cells markedly raised (Plate 67*f*).

ADAXIAL

STOMATA.—Common; triangular or sometimes low-dome; 2 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 68*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 68*c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 68*c,d*).

PRICKLES.—Abundant; costal prickles; intercostal prickles and hooks (Plate 68*a,d*).

SHORT CELLS.—Costal 3–5/row, >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal and intercostal abundant. *Cork Cells*: Costal common; intercostal infrequent (Plate 68*d*).

SILICA BODIES.—Costal dumbbell, ends straight, middle wide, short; intercostal tall and narrow, crenate-vertical, cross-shaped (Plate 68*d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical slightly longer; apex tapered (Plate 68*e*).

MACROHAIRS.—Abundant; intercostal; basal cells slightly to markedly raised (Plate 68*f*).

Pseudechinolaena polystachya (Kunth) Stapf

PLATES 69–70

ABAXIAL

STOMATA.—Common; low-dome, triangular, high-dome; 3 or 4 stomatal bands/intercostal zone, 1 or 2 rows/band. Shape of subsidiary cells difficult to determine because of collapsed cells (Plate 69*b*).

INTERSTOMATAL CELLS.—Square to rectangular; ends slightly concave; nonsinuous. *Papillae*: There seems to be one large, collapsed papilla on each cell. Ends and cell outlines are difficult to determine because of collapsed cells. Sometimes there are two interstomatal cells between stomata (Plate 69*c*).

LONG CELLS.—Square, rectangular; nonsinuous. *Papillae*: There seems to be one large, collapsed papilla on each cell. Outline of cells is difficult to determine because of collapsed cells (Plate 69*a,c*).

PRICKLES.—None seen.

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen. Sometimes there are several silica cells adjacent to each other without cork cells between (Plate 69*d*).

SILICA BODIES.—Costal nodular, dumbbell, ends concave, middle wide and short; intercostal not seen (Plate 69*d*).

MICROHAIRS.—Common; two-celled; basal longer, apical shorter; apex rounded (?). Both the basal and apical cells are commonly collapsed (Plate 69*e*).

MACROHAIRS.—Common; intercostal; basal cells slightly raised. Basal cells seem thin-walled and sometimes are deflated (Plate 69*f*).

ADAXIAL

STOMATA.—Infrequent; low-dome; distribution indeterminable because stomata are too infrequent (Plate 70*a*).

INTERSTOMATAL CELLS.—Rectangular; ends

slightly concave; slightly sinuous. *Papillae*: None seen.

LONG CELLS.—Rectangular to long, narrow, width uniform; slightly sinuous to markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 70*b,d*).

PRICKLES.—Common; intercostal and marginal prickles (Plate 70*b,d*).

SHORT CELLS.—Costal >5/row; intercostal not seen. *Silica Cells*: Costal infrequent; intercostal not seen. *Cork Cells*: Costal infrequent; intercostal not seen (Plate 70*c*).

SILICA BODIES.—Costal nodular or dumbbell, ends rounded or straight, middle short and narrow; intercostal not seen (Plate 70*c*).

MICROHAIRS.—Abundant; two-celled; basal and apical equal in length, medium or basal shorter, apical slightly longer; apex rounded (Plate 70*d,e*).

MACROHAIRS.—Common; intercostal; basal cells markedly raised (Plate 70*f*).

Rhynchelytrum kallimorphon W.D. Clayton

PLATES 71–72

ABAXIAL

Stomata.—Common to abundant; low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 71*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 71*b,c*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 71*d*).

PRICKLES.—Common; costal and intercostal prickles (Plate 71*a,e*).

SHORT CELLS.—Costal solitary, paired; intercostal solitary (cork cells only). *Silica Cells*: Costal infrequent; intercostal not seen. *Cork Cells*: Costal and intercostal infrequent (Plate 71*d,e*).

SILICA BODIES.—Costal dumbbell, ends straight, middle short and narrow; intercostal not seen (Plate 71*d,e*).

MICROHAIRS.—Infrequent; two-celled; basal and apical equal in length, medium to basal slightly shorter, apical slightly longer; apex tapered (Plate 71*c,f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Abundant; low-dome to triangular; 3 to 5 stomatal bands/intercostal zone, 1 or 2 rows/band (Plate 72*a,b*).

INTERSTOMATAL CELLS.—Rectangular; ends slightly to markedly concave; slightly to markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 72*c*).

LONG CELLS.—Long, narrow, width uniform; slightly to markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 72*e*).

PRICKLES.—Common; costal and intercostal prickles, intercostal hooks (Plate 72*b,c*).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal solitary (cork cells only). *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal infrequent (marginal areas only).

SILICA BODIES.—Costal nodular, dumbbell, ends concave or straight, middle narrow and short; intercostal not seen (Plate 72*d*).

MICROHAIRS.—Common; two-celled; basal and apical equal in length to basal slightly shorter, apical slightly longer; apex tapered (Plate 72*f*).

MACROHAIRS.—None seen.

Sacciolepis africana

C.E. Hubbard and Snowden

PLATES 73–74

ABAXIAL

STOMATA.—Abundant; low-dome or occasionally high-dome; 6–8 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band. Subsidiary cells are usually collapsed perhaps because of thin walls (Plate 73*b,c*).

INTERSTOMATAL CELLS.—Square to rectan-

gular; ends straight to convex; nonsinuous. *Papillae*: 1/cell, globose to elongate, uniform. *Papillae* are usually deflated. Sometimes there are 2 interstomatal cells between stomata (Plate 73a, c).

LONG CELLS.—Square to rectangular to pentagonal to hexagonal; nonsinuous. *Papillae*: 1/cell, globose to elongate, uniform (Plate 73a, d).

PRICKLES.—Abundant; costal papillate-type prickles. Prickles are very abundant on large veins (Plate 73e).

SHORT CELLS.—Costal solitary (silica cells only), paired, 3–5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen. Cork cells are papillate (Plate 73e).

SILICA BODIES.—Costal nodular, dumbbell, ends straight, middle wide and short; intercostal not seen (Plate 73e).

MICROHAIRS.—Common; two-celled; basal and apical equal in length to basal shorter, apical longer; apex tapered. Apical cell is usually deflated (Plate 73f).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Abundant; low-dome; 2–4 stomatal bands/intercostal zone, 1–2 rows/band. Subsidiary cells are usually collapsed (Plate 74b).

INTERSTOMATAL CELLS.—Square to rectangular; ends straight to convex nonsinuous. *Papillae*: 1/cell, elongate, uniform. *Papillae* are usually deflated. Sometimes there are 2 interstomatal cells between stomata (Plate 74c, d).

LONG CELLS.—Square to rectangular to pentagonal to hexagonal; nonsinuous. *Papillae*: 1/cell, elongate, uniform. *Papillae* are usually deflated (Plate 74c).

PRICKLES.—Abundant; costal papillate-type prickles (Plate 74d).

SHORT CELLS.—Costal paired, 3–5/row, >5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal common; intercostal not seen. Cork cells are papillate (Plate 74d).

SILICA BODIES.—Costal nodular or dumbbell, ends straight, middle wide, short; intercostal not seen (Plate 74d, e).

MICROHAIRS.—Infrequent; two-celled; basal and apical equal in length, medium; apex tapered. Microhairs are difficult to distinguish from papillae when both are collapsed (Plate 74f).

MACROHAIRS.—None seen.

Setaria plicatilis (Hochstetter) Engler

PLATES 75–76

ABAXIAL

STOMATA.—Common to abundant; triangular; 1, 2, or sometimes 3 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band (Plate 75a, b).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends straight to convex or slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 75b, c).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 75a, d).

PRICKLES.—Common; costal prickles; intercostal prickles and hooks. The base of the prickle is often deflated (Plate 75f).

SHORT CELLS.—Costal >5/row; intercostal solitary, paired. *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal infrequent. There are sometimes adjacent silica bodies without a cork cell between (Plate 75c, d, e).

SILICA BODIES.—Costal nodular (sometimes very long with 4–5 lobes on each side), dumbbell, ends straight, middle short, narrow; intercostal crenate-vertical, cross-shaped, or sometimes dumbbell, ends straight, middle short, wide (Plate 75c, d, e).

MICROHAIRS.—Common; two-celled; basal and apical equal in length, long or basal shorter, apical longer; apex tapered (Plate 75c).

MACROHAIRS.—Infrequent to common; inter-

costal; basal cells markedly raised. There are two sizes of macrohairs—one type is much longer than the other. The macrohairs occur in 3–4 rows in some of the intercostal zones (Plate 75f).

ADAXIAL

STOMATA.—Infrequent; triangular; 1 or sometimes 2 stomatal bands/intercostal zone, 1 row/band (Plate 76a,b).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 76a,c).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 76b,c).

PRICKLES.—Common; costal prickles; intercostal prickles and hooks (Plate 76a,c).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only). *Silica Cells*: Costal abundant; intercostal common. *Cork Cells*: Costal abundant; intercostal not seen. There are sometimes adjacent silica bodies without a cork cell between (Plate 76d,e).

SILICA BODIES.—Costal dumbbell, ends rounded, middle short, wide or narrow or sometimes nodular; intercostal crenate-vertical, cross-shaped (Plate 76d,e).

MICROHAIRS.—Common; two-celled; basal and apical equal in length to basal shorter, apical longer; apex tapered (Plate 76e).

MACROHAIRS.—Infrequent; intercostal; basal cells markedly raised. Macrohairs seem to be in widely separated rows and not very abundant in rows (Plate 76f).

Snowdenia petitiana (A. Richard)

C.E. Hubbard

PLATES 77–78

ABAXIAL

STOMATA.—Common to abundant; low-dome to triangular; 1 or sometimes 2 stomatal bands/intercostal zone, 1 or sometimes 2 rows/band.

Subsidiary cell shape is difficult to determine because cells are often collapsed (Plate 77b).

INTERSTOMATAL CELLS.—Rectangular (?); ends straight to convex; slightly sinuous. *Papillae*: None seen. Cells are often collapsed; shape and outline of walls are difficult to determine (Plate 77b).

LONG CELLS.—Rectangular to long, narrow, width uniform (?); slightly sinuous. *Papillae*: None seen. Cells are often collapsed; shape and outline of walls are difficult to determine (Plate 77b,c).

PRICKLES.—Common to abundant; costal and sometimes intercostal prickles (Plate 77b,c).

SHORT CELLS.—Costal solitary (silica cells only), paired, 3–5/row; intercostal not seen. *Silica Cells*: Costal common; intercostal not seen. *Cork Cells*: Costal infrequent to common; intercostal not seen (Plate 77b,d,f).

SILICA BODIES.—Costal nodular; intercostal not seen. Some are very long with many nodes (Plate 77d).

MICROHAIRS.—Infrequent; two-celled; basal and apical equal in length, medium to basal shorter, apical longer; apex rounded (?) (Plate 77e).

MACROHAIRS.—Common to abundant; costal; basal cells markedly raised (Plate 77a,f).

ADAXIAL

STOMATA.—Infrequent (seen near margin only); triangular to high-dome; distribution indeterminate because stomata are too infrequent (Plate 78b).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends straight to convex; slightly sinuous. *Papillae*: None seen (Plate 78b).

LONG CELLS.—Rectangular to long, narrow, width uniform (shape indeterminate except near margin because of collapsed cells); slightly sinuous. *Papillae*: None seen (Plate 78b,c).

PRICKLES.—Common to abundant; costal and sometimes intercostal prickles (Plate 78a,c).

SHORT CELLS.—Costal solitary, paired, 3–5/

row; intercostal not seen. *Silica Cells*: Costal infrequent to common; intercostal not seen. *Cork Cells*: Costal infrequent; intercostal not seen. Sometimes there are 2 or 3 adjacent silica bodies (Plate 78d).

SILICA BODIES.—Costal nodular (very long); intercostal not seen (Plate 78d).

MICROHAIRS.—Infrequent; two-celled; basal shorter, apical slightly longer; apex tapered (Plate 78e).

MACROHAIRS.—Common to abundant; intercostal and costal; basal cells markedly raised (Plate 78f).

***Stenotaphrum dimidiatum* (Linnaeus)
Brongniart**

PLATES 79–80

ABAXIAL

STOMATA.—Common; low-dome to triangular; 1 stomatal band/intercostal zone, 1 row/band (Plate 79b,e).

INTERSTOMATAL CELLS.—Long, narrow, width uniform or sometimes rectangular; ends slightly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen. Sometimes there are 2 interstomatal cells and a silica cell between stomata (Plate 79e).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 79a,e).

PRICKLES.—Infrequent; intercostal prickles (Plate 79e).

SHORT CELLS.—Costal >5 /row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal common; intercostal abundant. *Cork Cells*: Costal and intercostal common (Plate 79b,c).

SILICA BODIES.—Costal dumbbell, ends rounded or straight, middle wide, short; intercostal crenate-vertical or sometimes cross-shaped (Plate 79b,c).

MICROHAIRS.—Common to abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 79f).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common; low-dome to triangular; 1 or 2 stomatal bands/intercostal zone, 1 row/band (Plate 80b).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised (Plate 80c).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 80a,c).

PRICKLES.—Infrequent; costal prickles (Plate 80d).

SHORT CELLS.—Costal >5 /row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal common; intercostal abundant. *Cork Cells*: Costal common; intercostal infrequent to common (Plate 80d,e).

SILICA BODIES.—Costal dumbbell, ends rounded or straight, middle wide, short; intercostal crenate-vertical or sometimes cross-shaped (Plate 80d,e).

MICROHAIRS.—Common to abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 80f).

MACROHAIRS.—None seen.

***Stereochlaena caespitosa* W.D. Clayton**

PLATES 81–82

ABAXIAL

STOMATA.—None seen.

LONG CELLS.—Long, narrow, width uniform; nonsinuous. *Papillae*: None seen. The intercostal long cells are collapsed and folded and shape is difficult to determine (Plate 81a,b,c).

PRICKLES.—Abundant; costal prickles; intercostal prickles and hooks (Plate 81b,c).

SHORT CELLS.—Costal paired, 3–5/row, >5 /row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 81b,d).

SILICA BODIES.—Costal dumbbell, ends rounded or straight, middle wide and short; intercostal not seen (Plate 81b,d).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex tapered. Microhairs occur in rows adjacent to vein (Plate 81*e,f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common; low-dome; 2 or 3 stomatal bands/intercostal zone, 1 row/band (Plate 82*b,c*).

INTERSTOMATAL CELLS.—Rectangular; ends straight to convex; nonsinuuous. *Papillae*: None seen (Plate 82*c*).

LONG CELLS.—Rectangular to long, narrow, width uniform; nonsinuuous. *Papillae*: None seen (Plate 82*c*).

PRICKLES.—Abundant; costal prickles; intercostal prickles and hooks (Plate 82*b,c*).

SHORT CELLS.—Costal 3–5/row, >5/row; intercostal not seen. *Silica Cells*: Costal abundant; intercostal not seen. *Cork Cells*: Costal abundant; intercostal not seen (Plate 82*d,e*).

SILICA BODIES.—Costal dumbbell, ends rounded, middle wide and short; intercostal not seen (Plate 82*d,e*).

MICROHAIRS.—Abundant; two-celled; basal shorter, apical longer; apex tapered (Plate 82*f*).

MACROHAIRS.—None seen.

Tricholaena teneriffae (Linnaeus f.) Link

PLATES 83–84

ABAXIAL

STOMATA.—Common; triangular; 2 stomatal bands/intercostal zone, 2 or sometimes 1 row/band. Costal zones are high ridges, and intercostal zones are deep grooves. It is sometimes difficult to determine intercostal features (Plate 83*a, b*).

INTERSTOMATAL CELLS.—Long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 83*a,d*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 83*a,d*).

PRICKLES.—Infrequent; intercostal prickles (Plate 83*d*).

SHORT CELLS.—Costal >5/row; intercostal solitary, paired. *Silica Cells*: Costal abundant; intercostal infrequent. *Cork Cells*: Costal abundant; intercostal infrequent (Plate 83*c,e*).

SILICA BODIES.—Costal dumbbell, ends rounded or straight, middle wide, short; intercostal tall and narrow (Plate 83*c,e*).

MICROHAIRS.—Common; two-celled; basal shorter; apical longer; apex tapered (Plate 83*f*).

MACROHAIRS.—None seen.

ADAXIAL

STOMATA.—Common to abundant; low-dome to triangular; 2 stomatal bands/intercostal zone, 1–2 rows/band (Plate 84*a,b*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends straight to convex or slightly concave; nonsinuuous to slightly sinuous. *Papillae*: None seen. The entire interstomatal cell appears markedly raised giving the stomata a depressed appearance. There are often two interstomatal cells between stomata (Plate 84*a,c*).

LONG CELLS.—Long, narrow, width uniform; nonsinuuous to slightly sinuous. *Papillae*: None seen (Plate 84*c,d*).

PRICKLES.—Infrequent; intercostal prickles (Plate 84*d*).

SHORT CELLS.—Costal >5/row; intercostal solitary. *Silica Cells*: Costal common; intercostal infrequent. *Cork Cells*: Costal common; intercostal infrequent (Plate 84*d,e*).

SILICA BODIES.—Costal elongated sinuous, nodular, dumbbell, ends rounded, middle wide, short; intercostal cross-shaped, square (Plate 84*d, e*).

MICROHAIRS.—Infrequent; two-celled; basal shorter, apical longer; apex tapered (Plate 84*f*).

MACROHAIRS.—None seen.

Urochloa mosambicensis (Hackel) Dandy

ADAXIAL

PLATES 85-86

ABAXIAL

STOMATA.—Common to abundant; triangular or sometimes low-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 85*b,c*).

INTERSTOMATAL CELLS.—Rectangular to long, narrow, width uniform; ends slightly to markedly concave; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 85*c,d*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen (Plate 85*b,d*).

PRICKLES.—None seen.

SHORT CELLS.—Costal 3-5/row, >5/row, or sometimes paired; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal common to abundant; intercostal common. *Cork Cells*: Costal common to abundant; intercostal common (Plate 85*d*).

SILICA BODIES.—Costal dumbbell, ends concave or straight, middle narrow or wide, short, sometimes cross-shaped, rarely nodular; intercostal crenate-vertical or cross-shaped (Plate 85*d*).

MICROHAIRS.—Common; two-celled; basal shorter, apical longer; apex rounded (Plate 85*e*).

MACROHAIRS.—Infrequent; intercostal and costal; basal cells markedly raised. Macrohairs often occur in pairs where they do occur, but they are sparsely distributed (Plate 85*f*).

STOMATA.—Common to abundant; low-dome to triangular or sometimes high-dome; 2 stomatal bands/intercostal zone, 1 row/band (Plate 86*b*).

INTERSTOMATAL CELLS.—Rectangular or sometimes long, narrow, width uniform; ends slightly concave; markedly sinuous, interlocking, raised (?). *Papillae*: None seen (Plate 86*b*).

LONG CELLS.—Long, narrow, width uniform; markedly sinuous, interlocking, raised. *Papillae*: None seen. Often the demarcations of the cell walls are not obvious, and it is difficult to distinguish one cell from another (Plate 86*a,c*).

PRICKLES.—Infrequent; intercostal prickles and hooks (Plate 86*c*).

SHORT CELLS.—Costal >5/row; intercostal solitary (silica cells only), paired. *Silica Cells*: Costal common; intercostal infrequent to common. *Cork Cells*: Costal common; intercostal infrequent (Plate 86*a,d*).

SILICA BODIES.—Costal cross-shaped or dumbbell, ends straight or lobed, middle wide, short; intercostal crenate-vertical, cross-shaped (Plate 86*a,d*).

MICROHAIRS.—Infrequent to common; two-celled; basal shorter, apical longer; apex tapered (Plate 86*e*).

MACROHAIRS.—Infrequent to common; basal cells markedly raised. Only the basal cells are left, or parts of the shaft, no intact hairs seen (Plate 86*f*).

APPENDIX

Material Studied

<i>Species</i>	<i>Collection</i>	<i>Origin</i>	<i>Herbarium</i>
<i>Acritochaete volkensis</i>	Davidse 7008	Kenya	MO
<i>Acroceras zizanioides</i>	Reekmans 4864	Burundi	MO
<i>Alloteropsis angusta</i>	Hitchcock 24788	Kenya	US
<i>Antheplora elongata</i>	Adamson 10	Tanzania	K
<i>Arundinella nepalensis</i>	Liebenberg 2390	S. Africa	US
<i>Axonopus flexuosus</i>	Trapnell 1701	N. Rhodesia	MO
<i>Brachiaria brizantha</i>	Hitchcock 24884	Uganda	US
<i>Cenchrus ciliaris</i>	Bogdan 2242	Kenya	K
<i>Chaetopoa taylori</i>	Milne-Redhead & Taylor 9684	Tanzania	K
<i>Chloachne oplismenoides</i>	Brenan, Jones, Rich- ards 9551	British Camerouns	US
<i>Chlorocalymma cryptacanthum</i>	Greenway & Kanuri 13980	Tanzania	MO
<i>Coelachne africana</i>	Auquier 3437	Rwanda	MO
<i>Cyrtococcum multinode</i>	Dawkins D571	Uganda	K
<i>Digitaria diagonalis</i> var. <i>uniglumis</i>	Boaler 738	Tanzania	K
<i>Eccoptocarpa obconiciventris</i>	Boaler 246	Tanzania	K
<i>Echinochloa haploclada</i>	Johnston s.n. 2 No- vember 1933	Uganda	K
<i>Entolasia imbricata</i>	Bogdan 4054	Kenya	K
<i>Eriochloa meyerana</i>	Glover, Gwynne & Samuel 454	Kenya	K
<i>Gilglochloa indurata</i>	Greenway 14367	Tanzania	MO
<i>Heteranthoecia guineensis</i>	Simon & Williamson 1925	Zambia	MO
	Davidse & Handlos 7217	Zambia	US
<i>Holcolemma inaequale</i>	Polhill & Paulo 619	Kenya	K
<i>Hylebates chlorochloae</i>	Bogdan AB 3909	Kenya	K
<i>Isachne buettneri</i>	Baldwin	Kenya	MO
<i>Loudetia arundinacea</i>	Thomas 3920	Uganda	US
<i>Melinis ambigua</i>	Greenway 14489	Tanzania	MO
<i>Odontelytrum abyssinicum</i>	Ash 2103	Ethiopia	MO
<i>Oplismenus burmannii</i>	Nicholson 213	Tanzania	K
<i>Panicum trichoides</i>	Gillman 1462	Tanzania	K
<i>Paspalidium geminatum</i>	Ash 1376	Ethiopia	MO

Material Studied—*Continued.*

<i>Species</i>	<i>Collection</i>	<i>Origin</i>	<i>Herbarium</i>
<i>Paspalum conjugatum</i>	Lye 6171	Uganda	K
<i>Pennisetum purpureum</i>	Liebenberg 489	Uganda	K
<i>Pseudechinolaena polystachya</i>	Mwasumbi, Harris & Tadro 10830 Ma- gogo 1537	Tanzania Kenya	MO K
<i>Rhynchelytrum kallimorphon</i>	Milne-Redhead & Taylor 9423	Tanzania	K
<i>Sacciolepis africana</i>	Thomas 4544	Uganda	US
<i>Setaria plicatilis</i>	Hitchcock 24746	Kenya	K
<i>Snowdenia petitiiana</i>	Thomas 2573	Uganda	K
<i>Stenotaphrum dimidiatum</i>	Allan 145	Kenya	K
<i>Stereochlaena caespitosa</i>	Faulkner 1424	Tanzania	K
<i>Tricholaena teneriffae</i>	Dyson-Hudson 6	Uganda	US
<i>Trichopteryx stolziana</i>	Reekmans 1786	Burundi	MO
<i>Tristachya bequaertii</i>	Milne-Redhead 3845	Rhodesia	US
<i>Urochloa mosambicensis</i>	Brooks G104	Uganda	K
<i>Zonotriche inamoena</i>	Davidse & Handlos 7270	Zambia	MO

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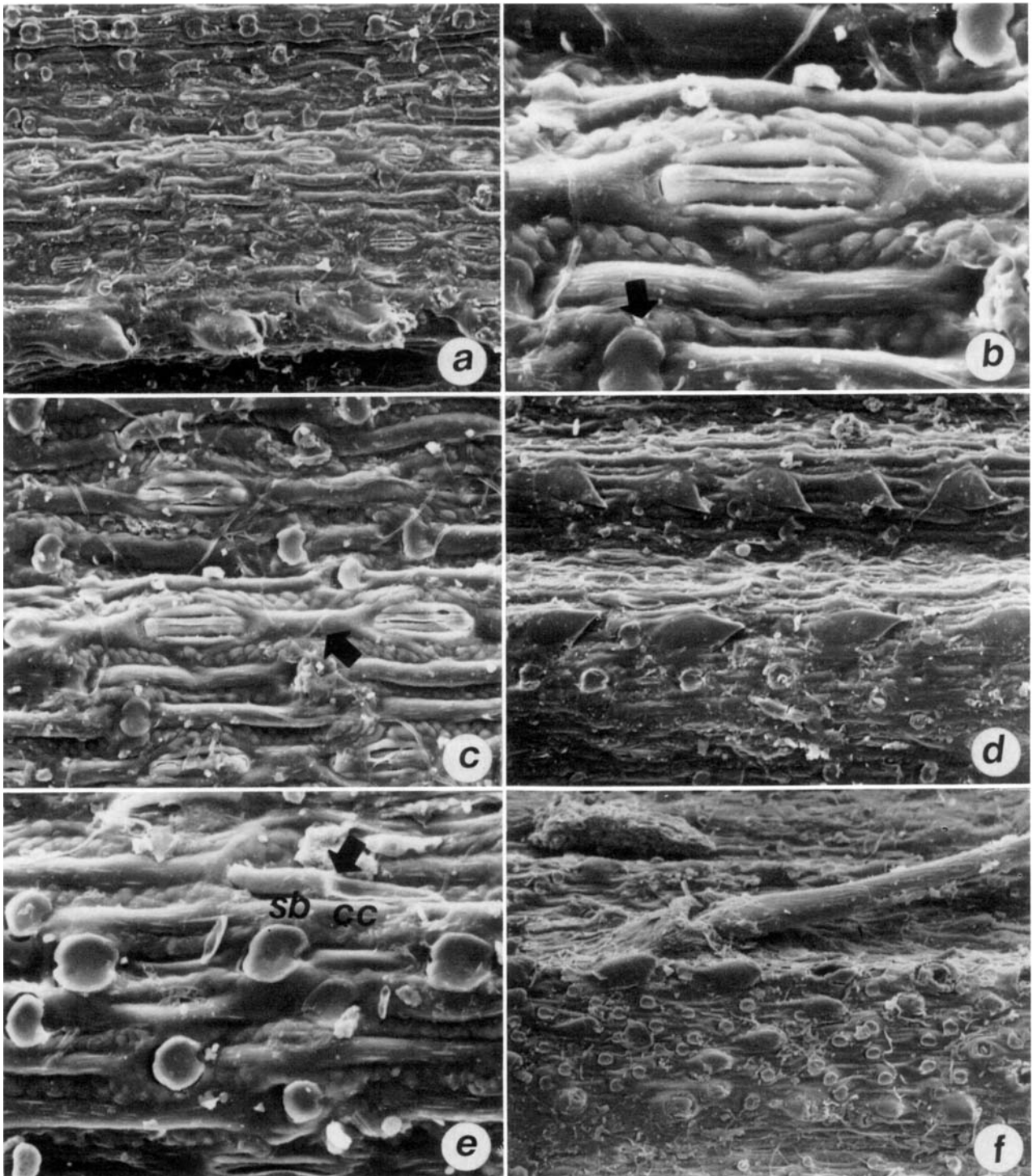


PLATE 1.—Abaxial epidermis *Arundinella nepalensis*, Liebenberg 2390: *a*, overview of wide intercostal zone, $\times 208$; *b*, stoma, long cells, intercostal silica body (arrow), $\times 960$; *c*, interstomatal cell (arrow), long cells, $\times 448$; *d*, costal prickles, $\times 240$; *e*, costal silica bodies (sb), cork cells (cc), microhair (arrow), $\times 640$; *f*, macrohair, $\times 160$.

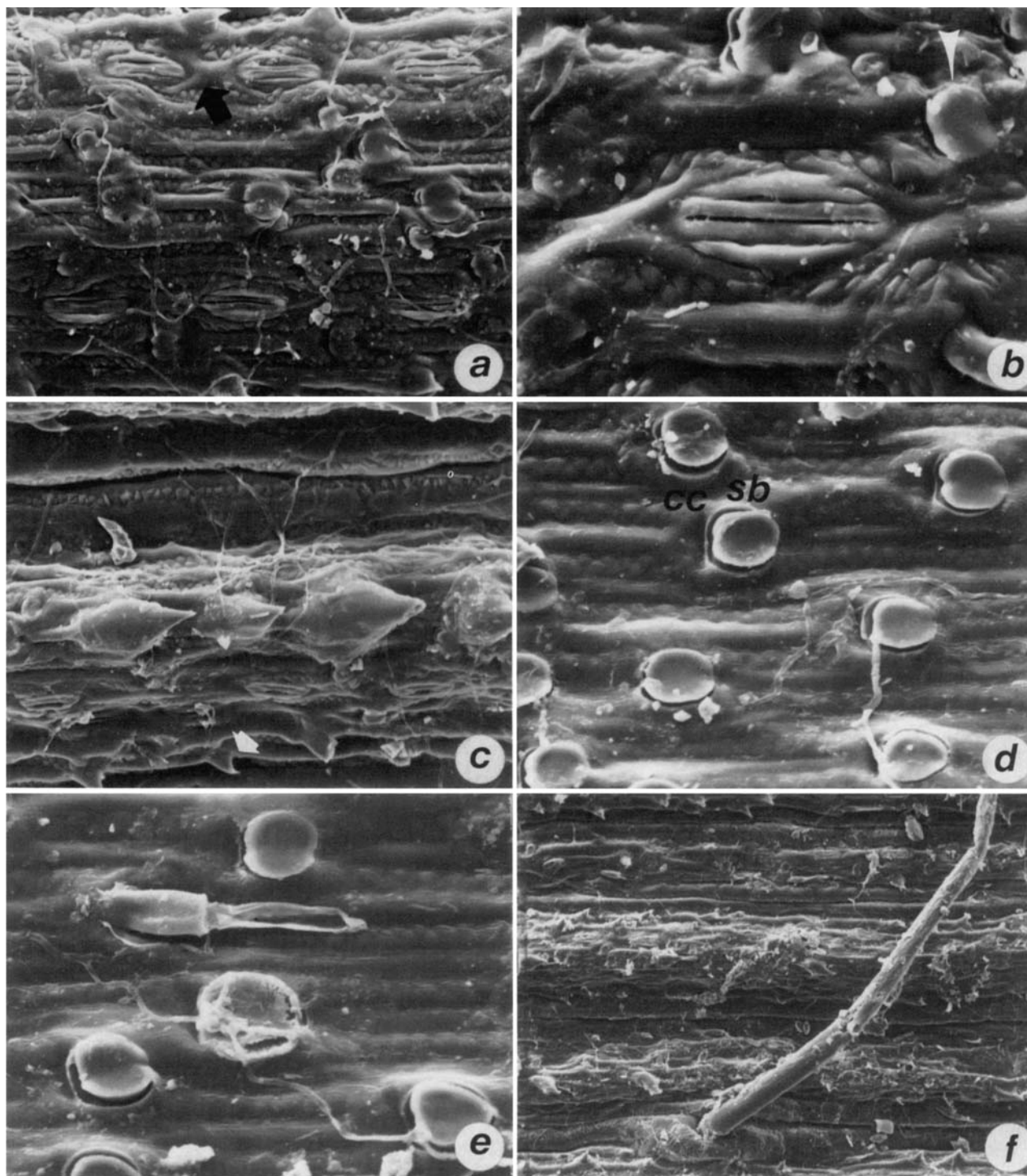


PLATE 2.—Adaxial epidermis *Arundinella nepalensis*, Liebenberg 2390: *a*, overview, interstomatal cells (arrow), $\times 384$; *b*, stoma, intercostal silica body (arrow), $\times 960$; *c*, costal and intercostal prickles (arrow), long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, $\times 768$; *f*, macrohair, $\times 120$.

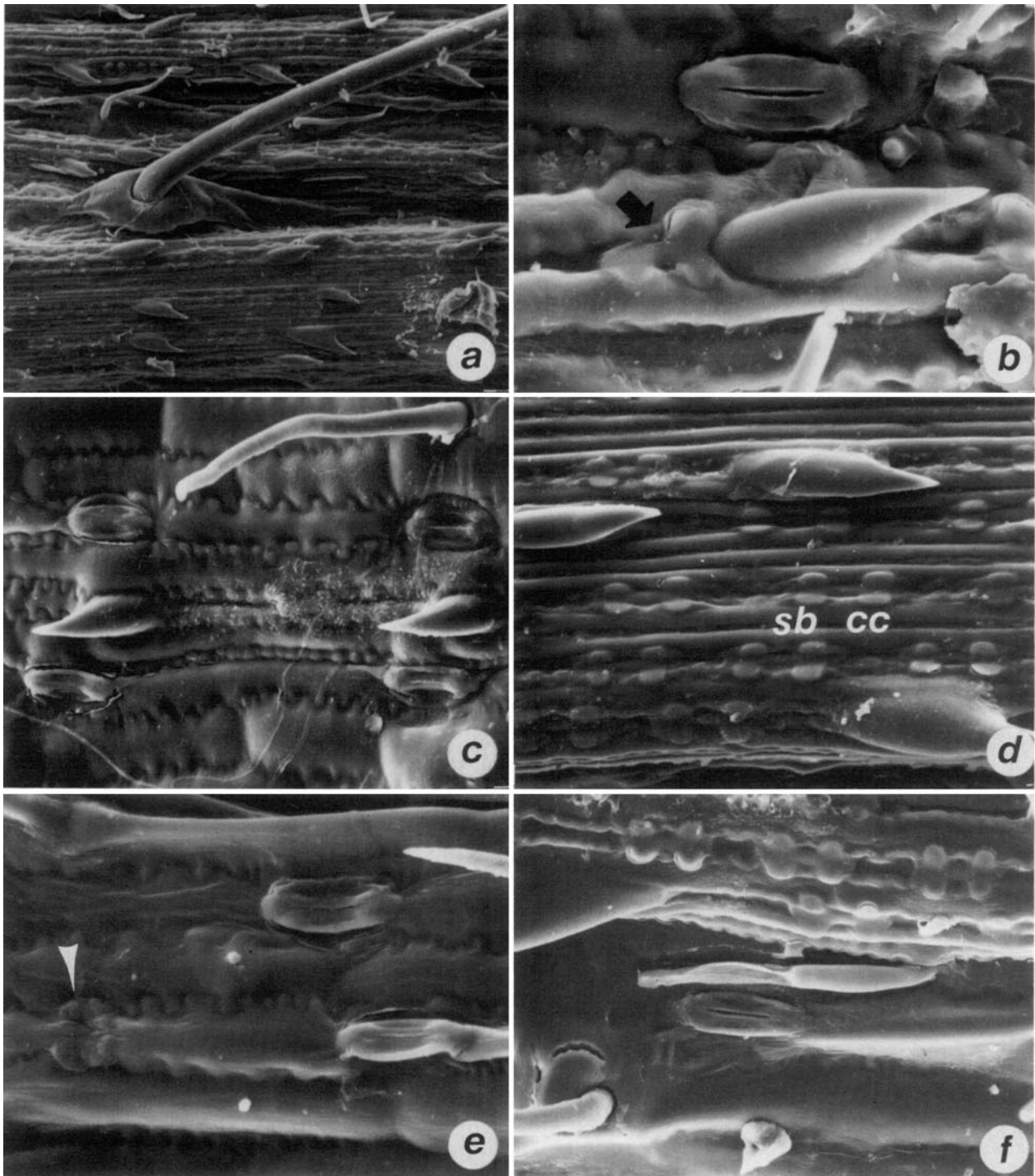


PLATE 3.—Abaxial epidermis *Gilgichloa indurata*, Greenway 14367: *a*, overview, macrohair, $\times 160$; *b*, stoma, costal silica body (arrow), prickle, $\times 1287$; *c*, interstomatal cell, long cells, macrohair, $\times 608$; *d*, costal prickles, silica bodies (sb), cork cells (cc), $\times 640$; *e*, long cells, intercostal cork cell (arrow), $\times 912$; *f*, microhair, $\times 640$.

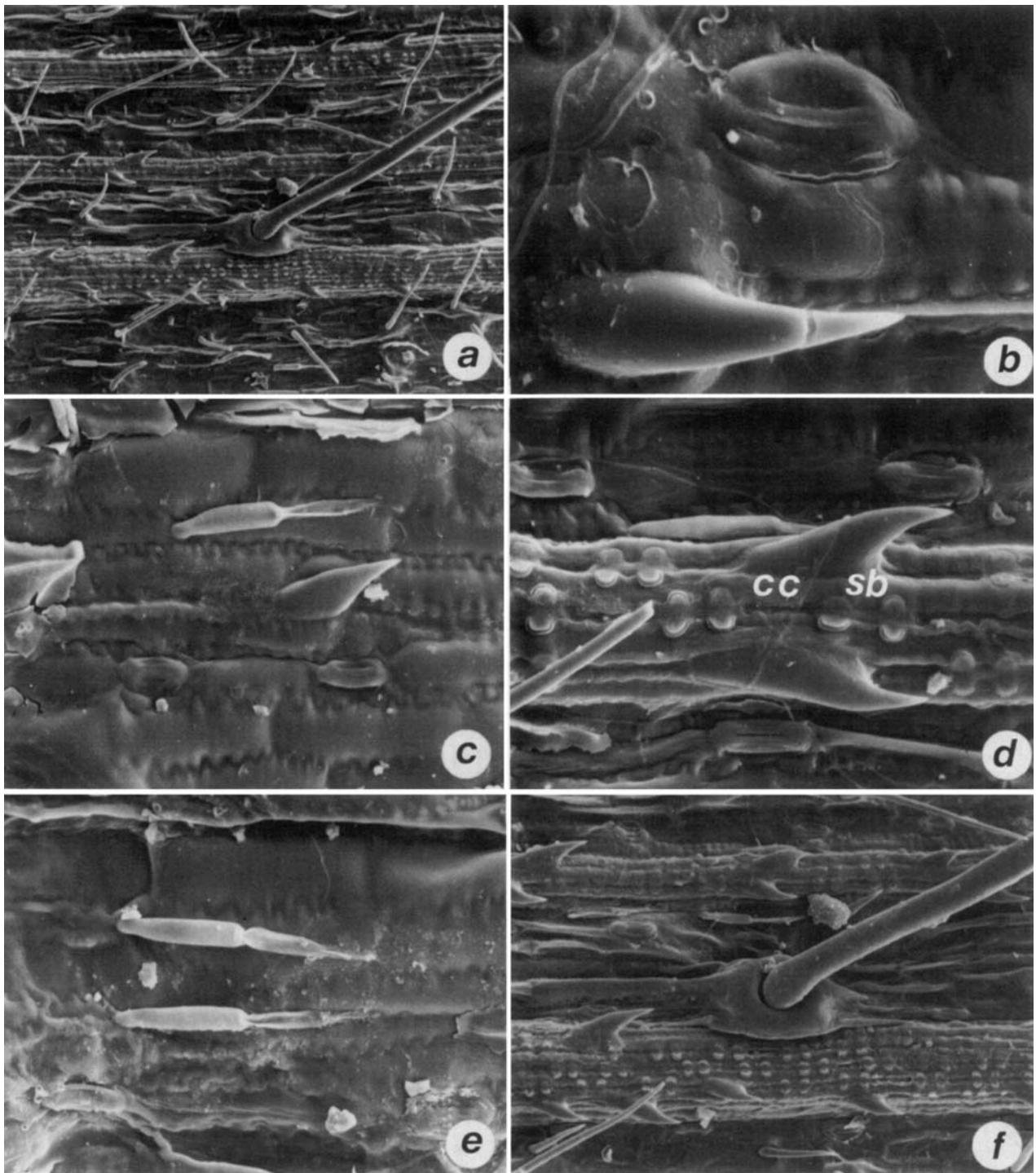


PLATE 4.—Adaxial epidermis *Gilgichloa indurata*, Greenway 14367: *a*, overview, macrohairs, $\times 120$; *b*, stoma, $\times 1250$; *c*, interstomatal cell, long cells, intercostal prickles, $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), prickles, $\times 640$; *e*, microhair, $\times 544$; *f*, macrohair, $\times 324$.

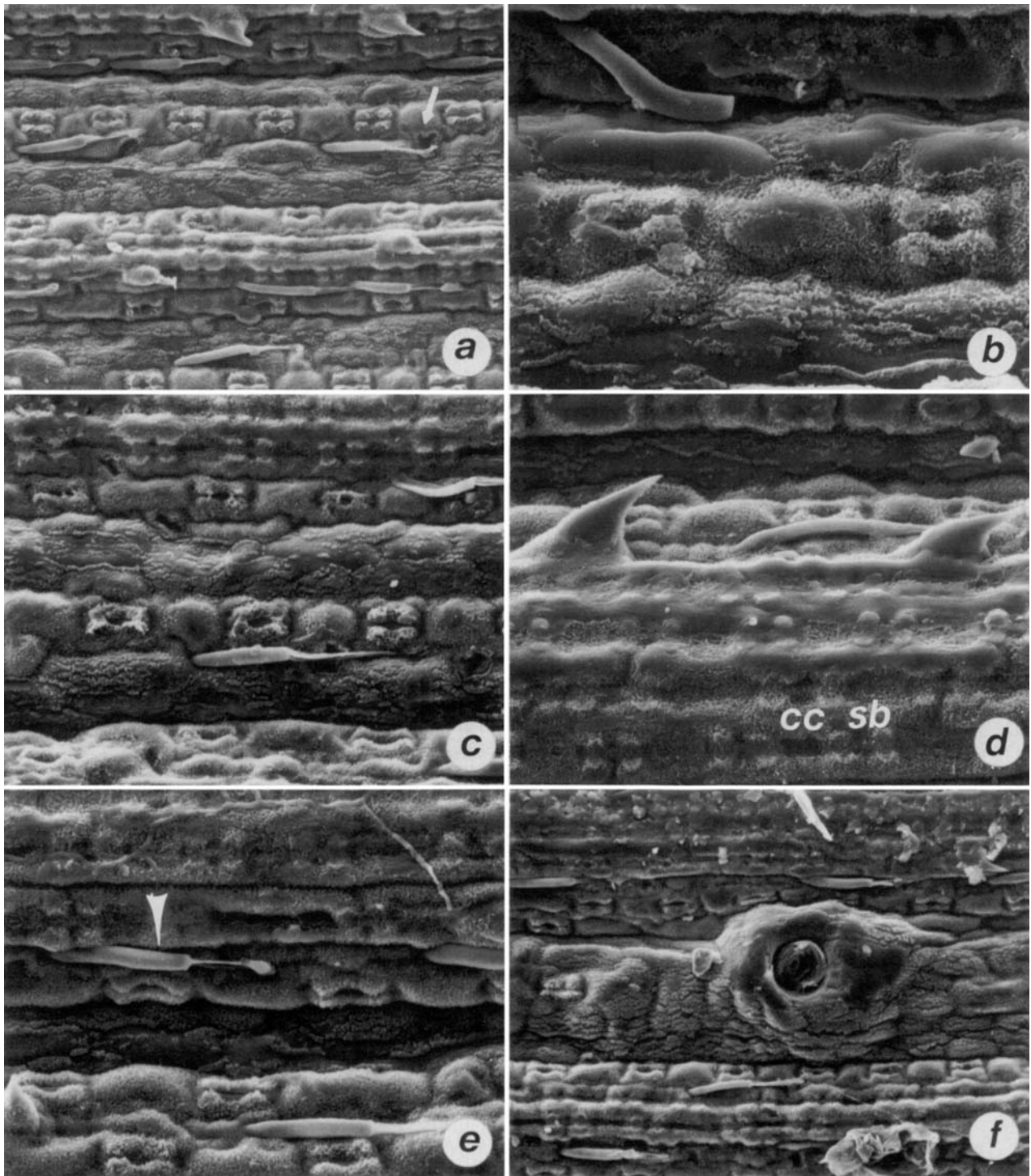


PLATE 5.—Abaxial epidermis *Loudetia arundinacea*, Thomas 3920: *a*, overview, intercostal cork cell (arrow), $\times 320$; *b*, stomata, interstomatal cell, $\times 960$; *c*, interstomatal cells, long cells, $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhairs (arrow), $\times 640$; *f*, base of macrohair, $\times 320$.

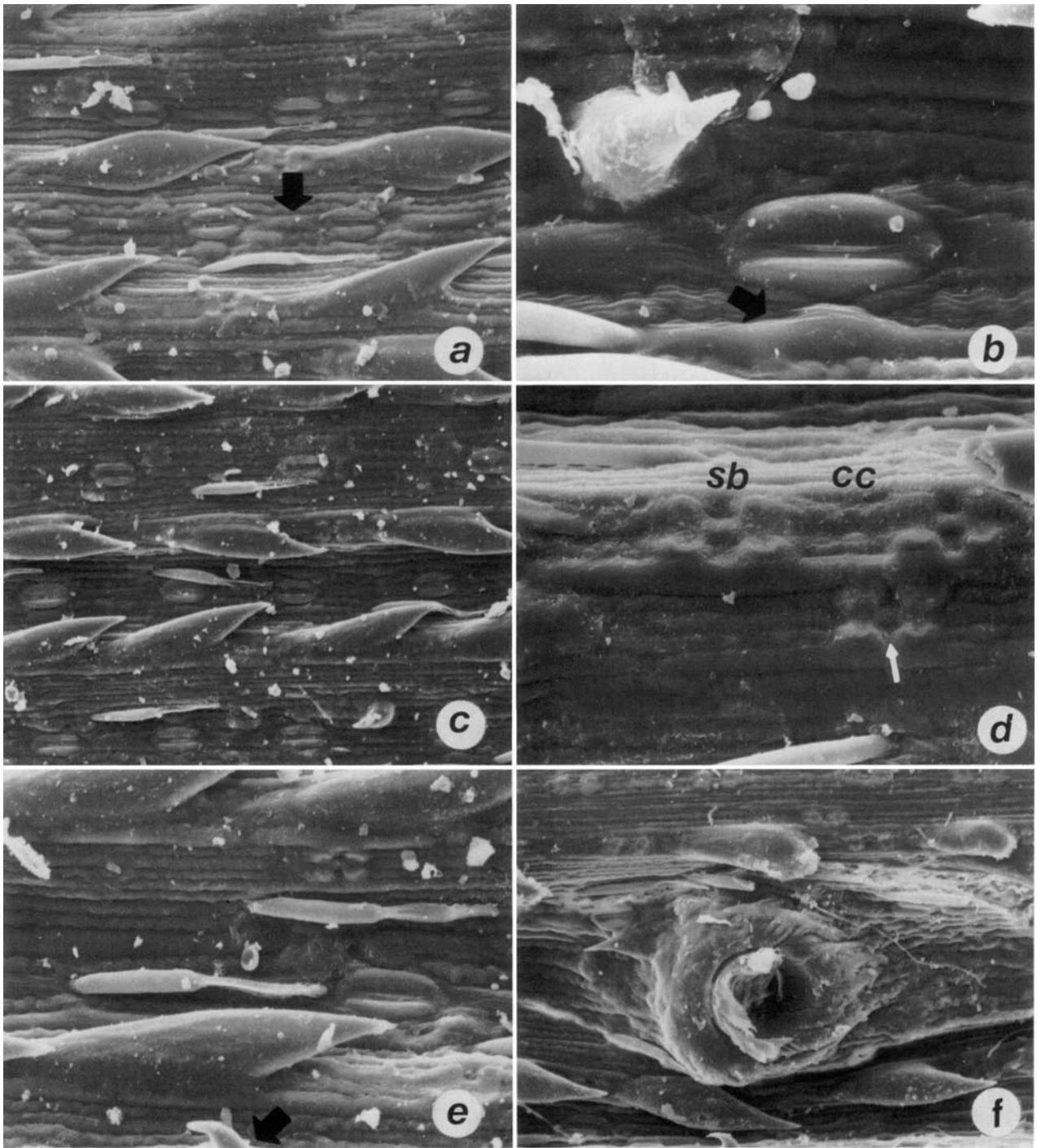


PLATE 6.—Adaxial epidermis *Loudetia arundinacea*, Thomas 3920: *a*, overview, interstomatal cell (arrow), long cells, $\times 384$; *b*, stoma, long cell with papilla (arrow), $\times 1250$; *c*, costal prickles, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 960$; *e*, microhairs, intercostal hooks (arrow), $\times 640$; *f*, base of macrohair, $\times 352$.

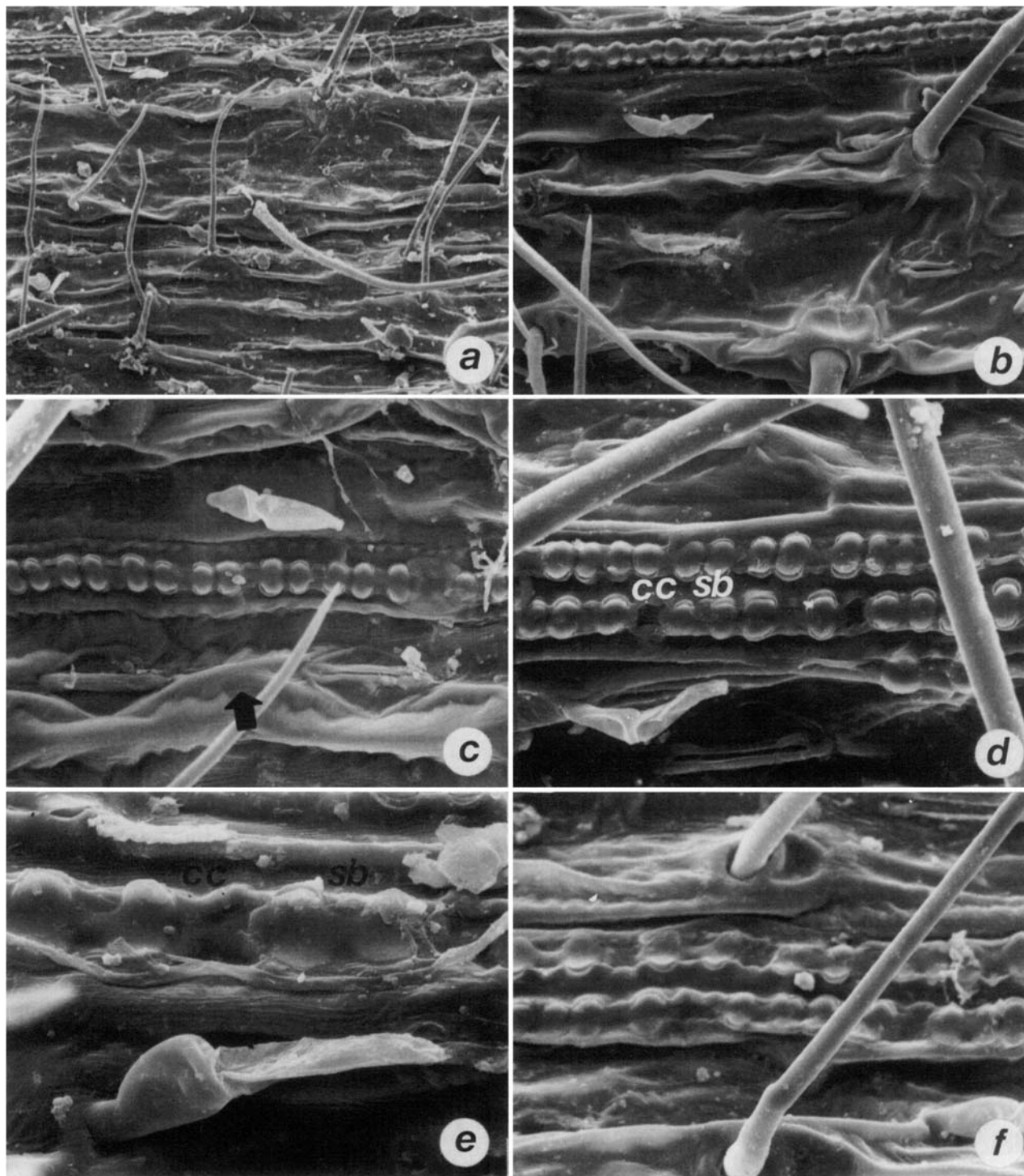


PLATE 7.—Abaxial epidermis *Trichopteryx stolziana*, Reekmans 1786: *a*, overview, $\times 160$; *b*, stomata, $\times 320$; *c*, interstomatal cell (arrow), long cells, microhair, $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, costal silica bodies (sb), cork cells (cc), $\times 1250$; *f*, macrohairs, $\times 640$.

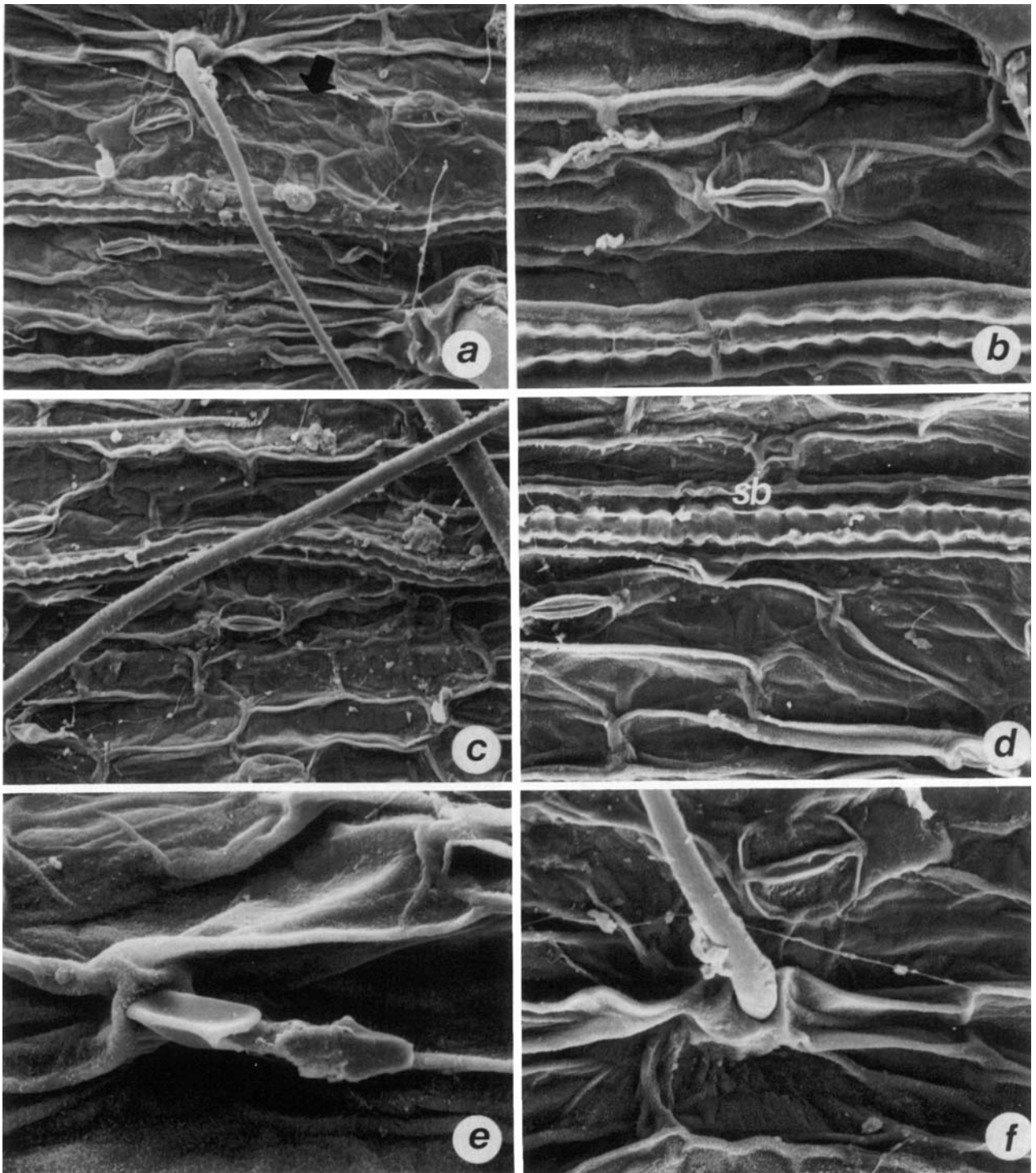


PLATE 8.—Adaxial epidermis *Trichopteryx stolziana*, Reekmans 1786: *a*, overview, interstomatal cell (arrow), $\times 320$; *b*, stomata, $\times 640$; *c*, long cells, $\times 320$; *d*, costal silica bodies (sb), $\times 480$; *e*, microhair, $\times 1250$; *f*, base of macrohair, $\times 640$.

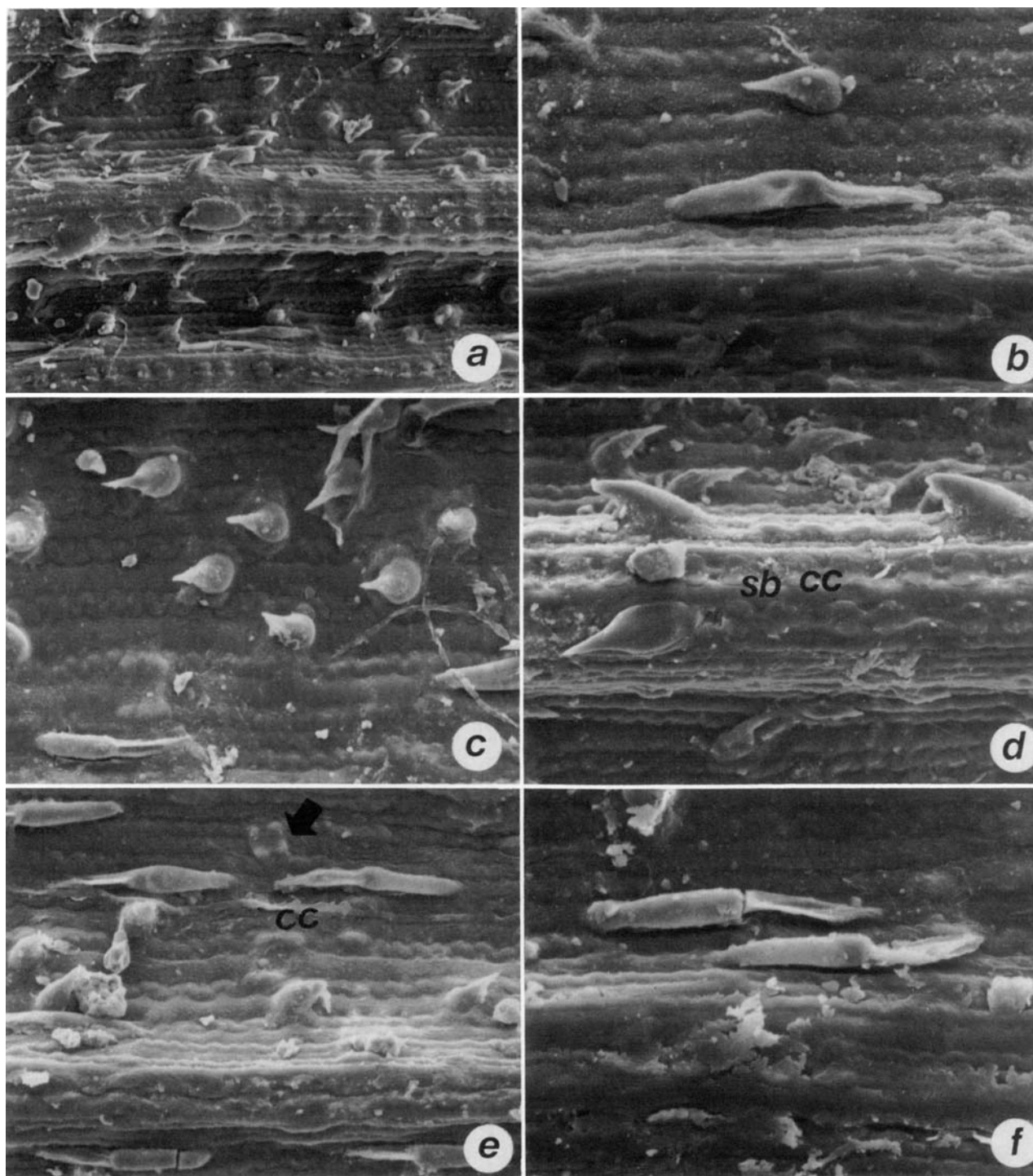


PLATE 9.—Abaxial epidermis *Tristachya bequaertii*, Milne-Redhead 3845: *a*, overview, $\times 264$; *b*, long cells, intercostal hook, microhair, $\times 864$; *c*, intercostal hooks, $\times 576$; *d*, costal prickles, silica bodies (sb), cork cells (cc), $\times 576$; *e*, microhairs, intercostal silica body (arrow), intercostal cork cell (cc), $\times 576$; *f*, microhairs, $\times 864$.

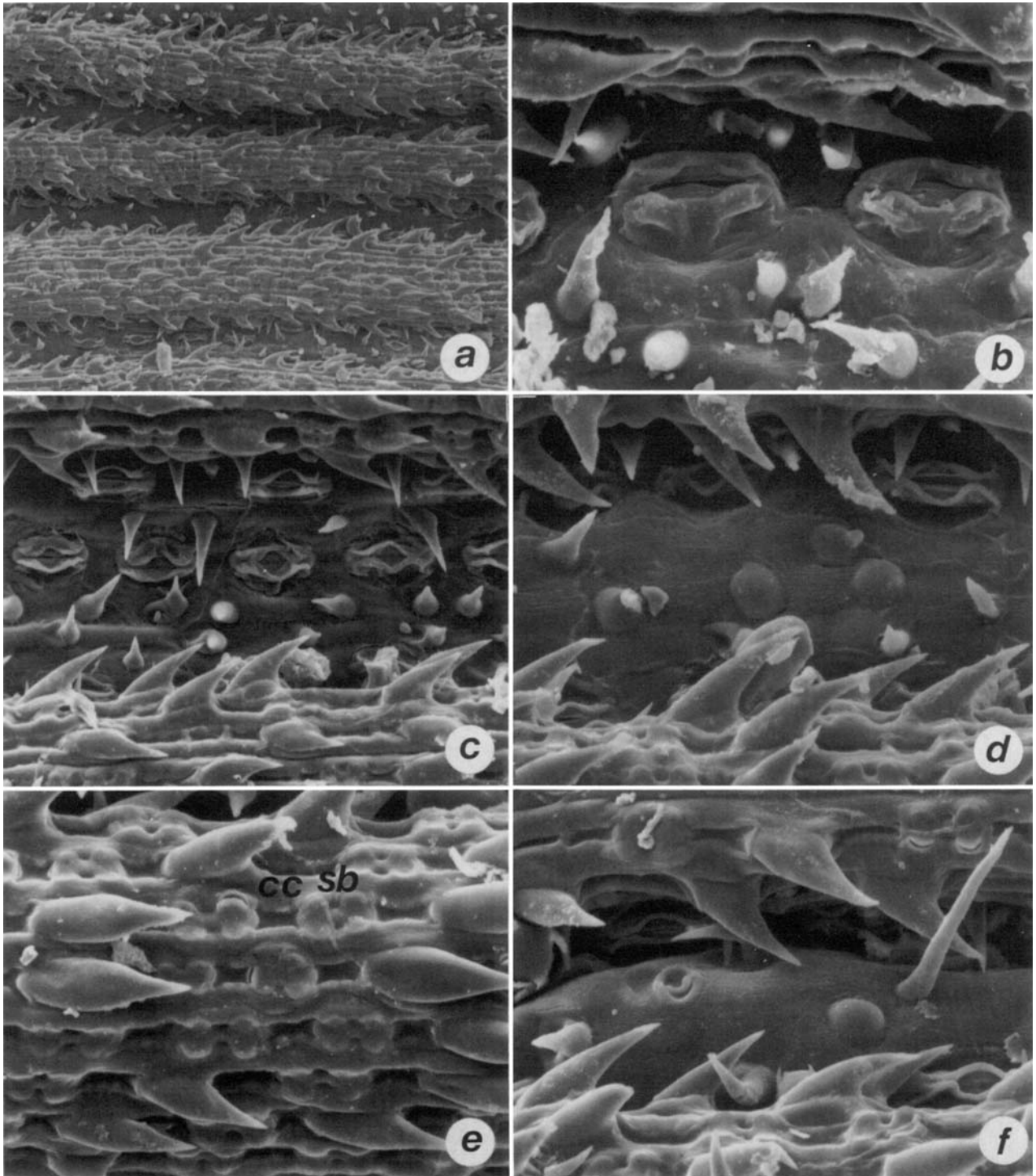


PLATE 10.—Adaxial epidermis *Tristachya bequaertii*, Milne-Redhead 3845: *a*, overview, $\times 160$; *b*, stomata, interstomatal cells, $\times 864$; *c*, intercostal zone with prickles and hooks, $\times 432$; *d*, intercostal zone with papillate-type prickles, long cells, $\times 640$; *e*, costal prickles, silica bodies (sb), cork cells (cc), $\times 691$; *f*, intercostal short macrohair, $\times 640$.

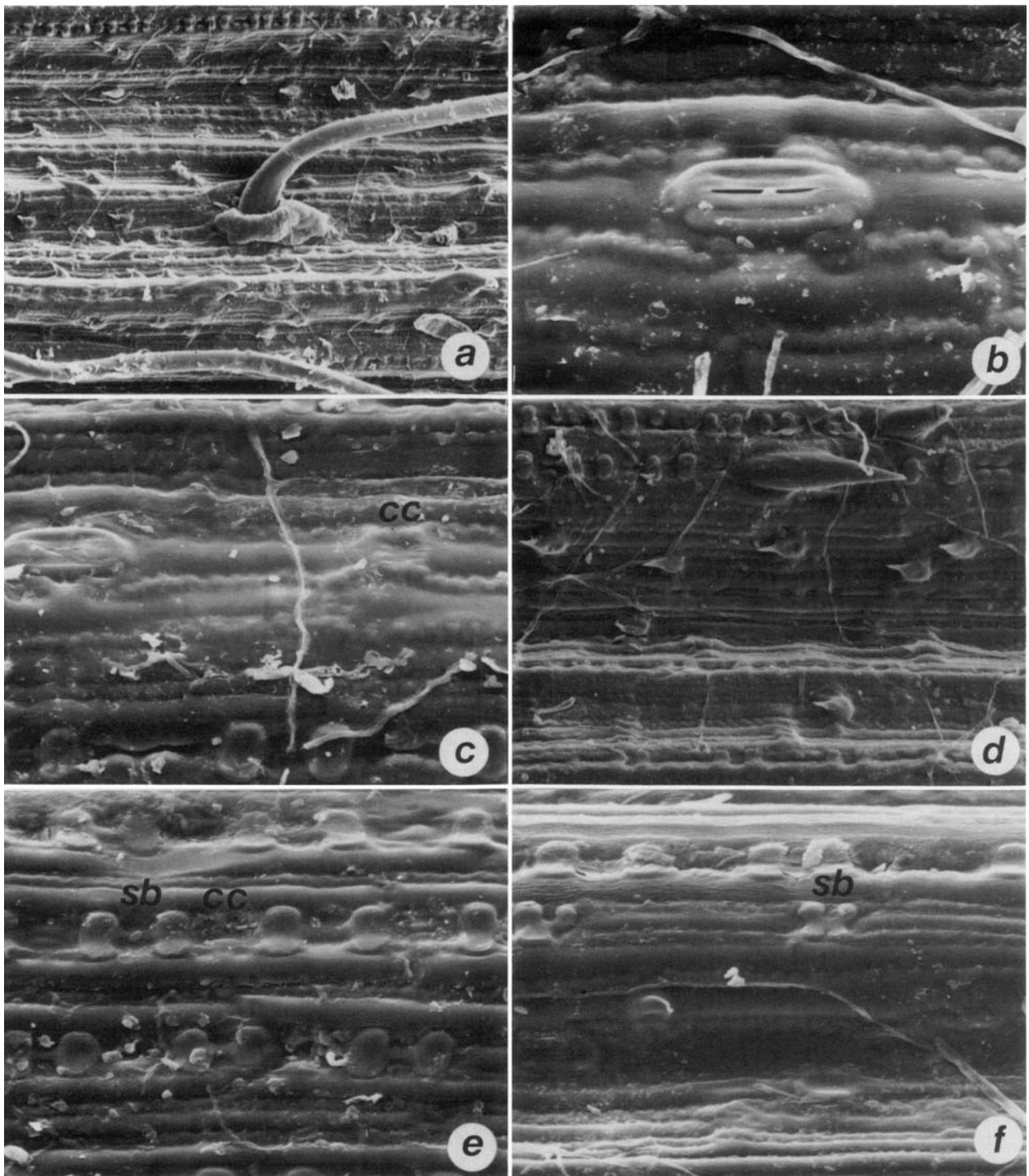


PLATE 11.—Abaxial epidermis *Zonotriche inamoena*, Davidse and Handlos 7270: *a*, overview, macrohair, $\times 160$; *b*, stoma, long cells, $\times 960$; *c*, interstomatal cell, intercostal cork cell (cc), $\times 640$; *d*, costal prickles, intercostal hooks, $\times 320$; *e*, costal silica bodies (sb), cork cells (cc), $\times 640$; *f*, intercostal silica body (sb), $\times 640$.

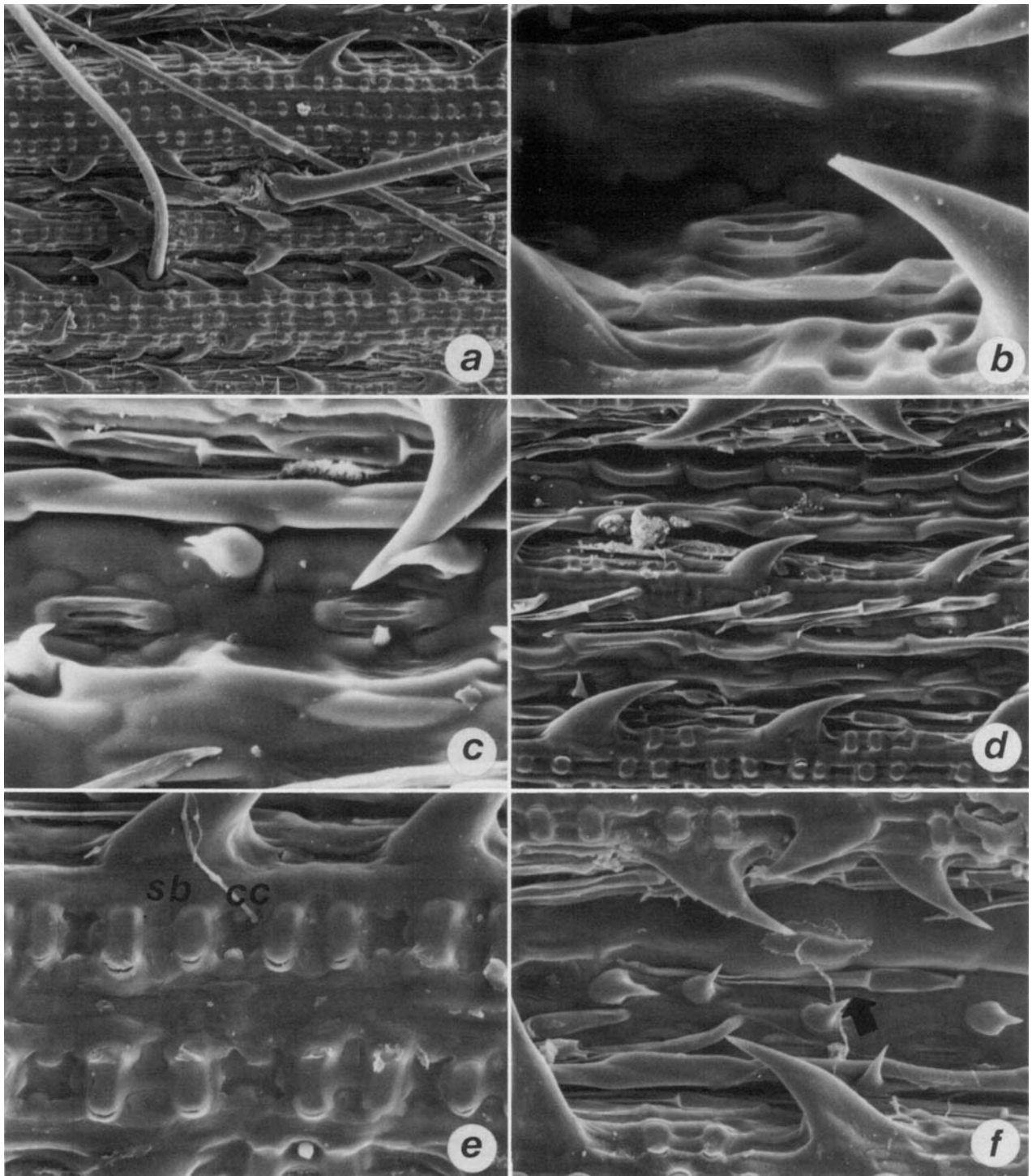


PLATE 12.—Adaxial epidermis *Zonotriche inamoena*, Davidse and Handlos 7270: *a*, overview, macrohairs, $\times 160$; *b*, stoma, $\times 1875$; *c*, interstomatal cell, long cells, $\times 896$; *d*, costal prickles, microhairs, $\times 320$; *e*, costal silica bodies (sb), cork cells (cc), $\times 640$; *f*, microhair (arrow), hooks, costal prickles, $\times 480$.

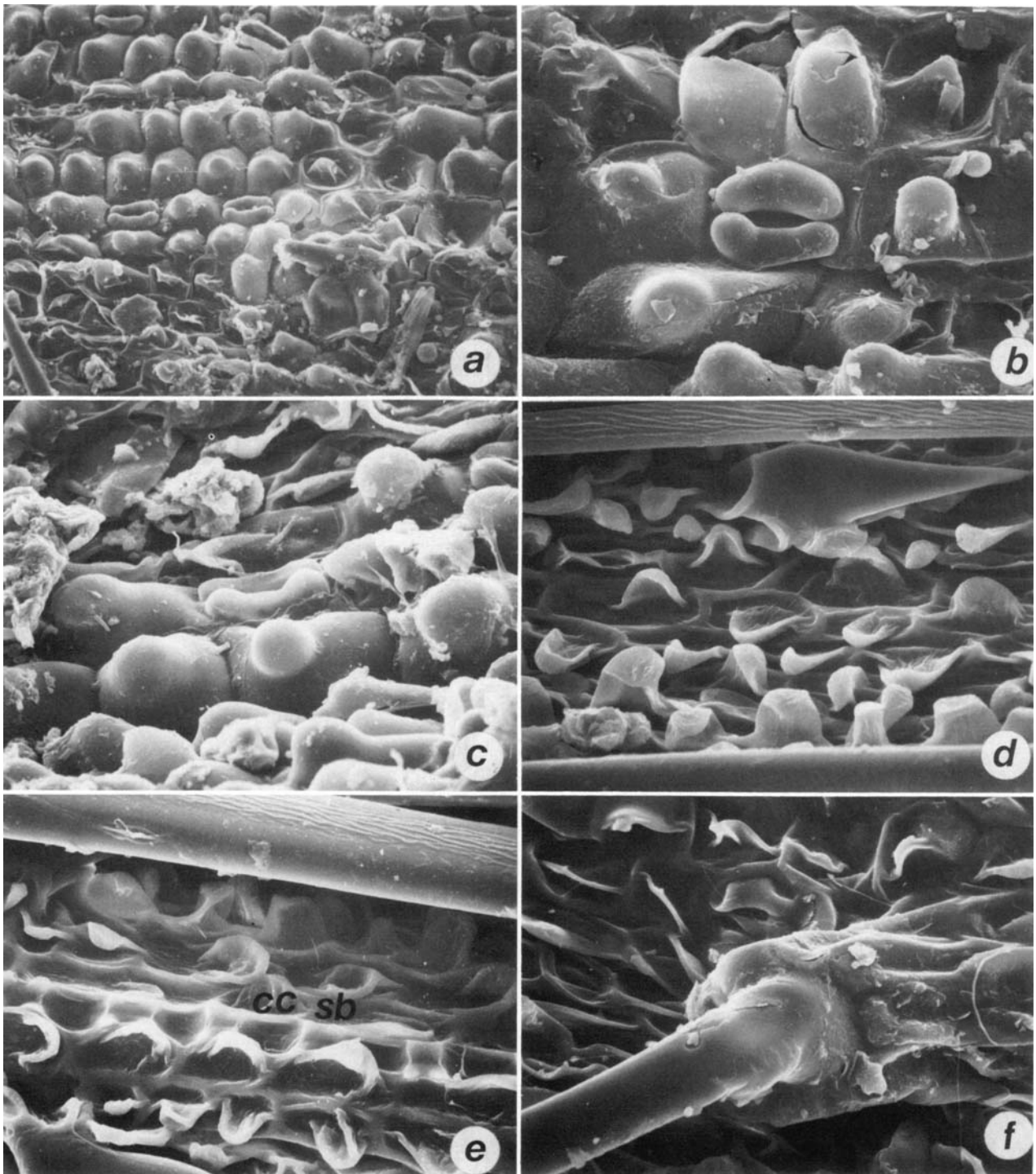


PLATE 13.—Abaxial epidermis *Coelachne africana*, Auquier 3437 (*d*, *e*), Schlieben 4161 (*a*–*c*, *f*): *a*, overview, $\times 295$; *b*, stoma, interstomatal cells, long cells, $\times 867$; *c*, long cells with inflated papillae, $\times 867$; *d*, long cells with deflated papillae, intercostal prickle, $\times 867$; *e*, costal silica bodies (sb), cork cells (cc), $\times 867$; *f*, base of macrohair, $\times 625$.

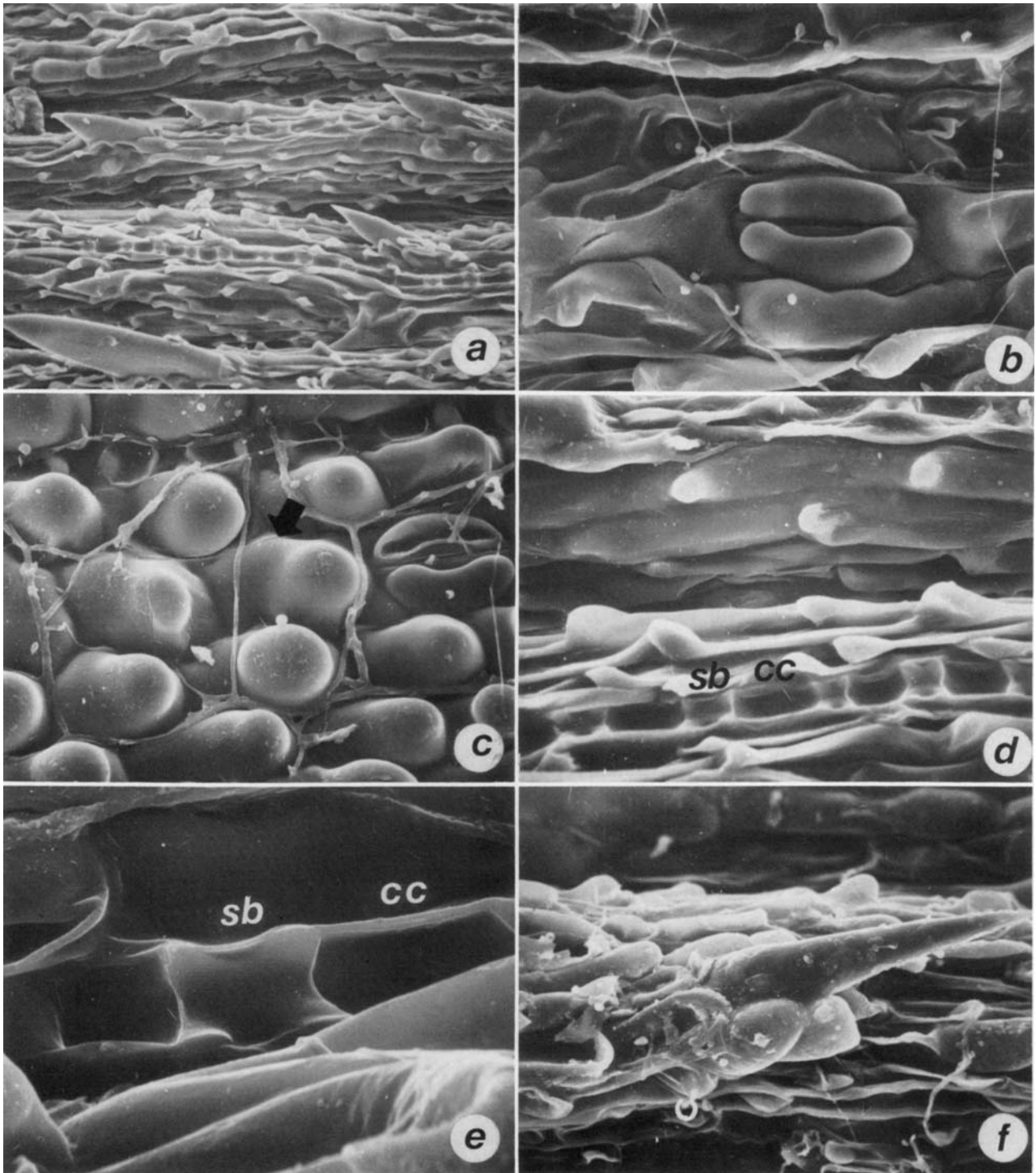


PLATE 14.—Adaxial epidermis *Coelachne africana*, Auquier 3437 (*a,d*), Schlieben 4161 (*b,c,e,f*): *a*, overview, $\times 295$; *b*, stoma, long cells, $\times 960$; *c*, long cells and interstomatal cells (arrow), $\times 867$; *d*, costal silica bodies (sb), cork cells (cc), $\times 867$; *e*, costal silica body (sb), cork cell (cc), $\times 2970$; *f*, intercostal prickles, $\times 625$.

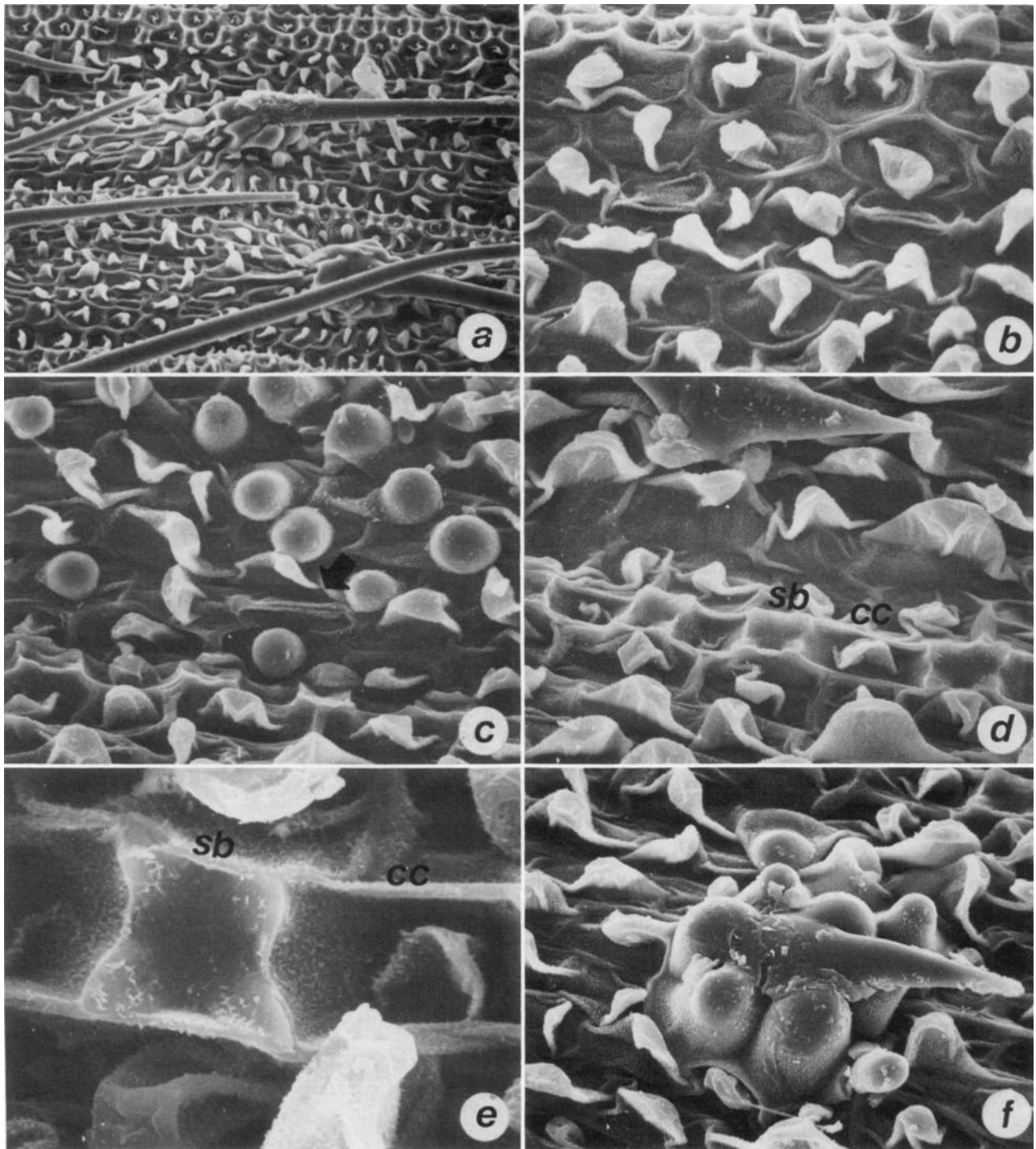


PLATE 15.—Abaxial epidermis *Heterantheroecia guineensis*, Simon and Williamson 1925 (*a*), Davidse and Handlos 7217 (*b-f*): *a*, overview, macrohairs, $\times 295$; *b*, stomata, interstomatal cells, long cells, $\times 867$; *c*, stoma (arrow), long cells, $\times 867$; *d*, costal silica bodies (sb), cork cells (cc), $\times 867$; *e*, costal silica body (sb), papillate cork cell (cc), $\times 2970$; *f*, intercostal prickle with raised basal cells, $\times 867$.

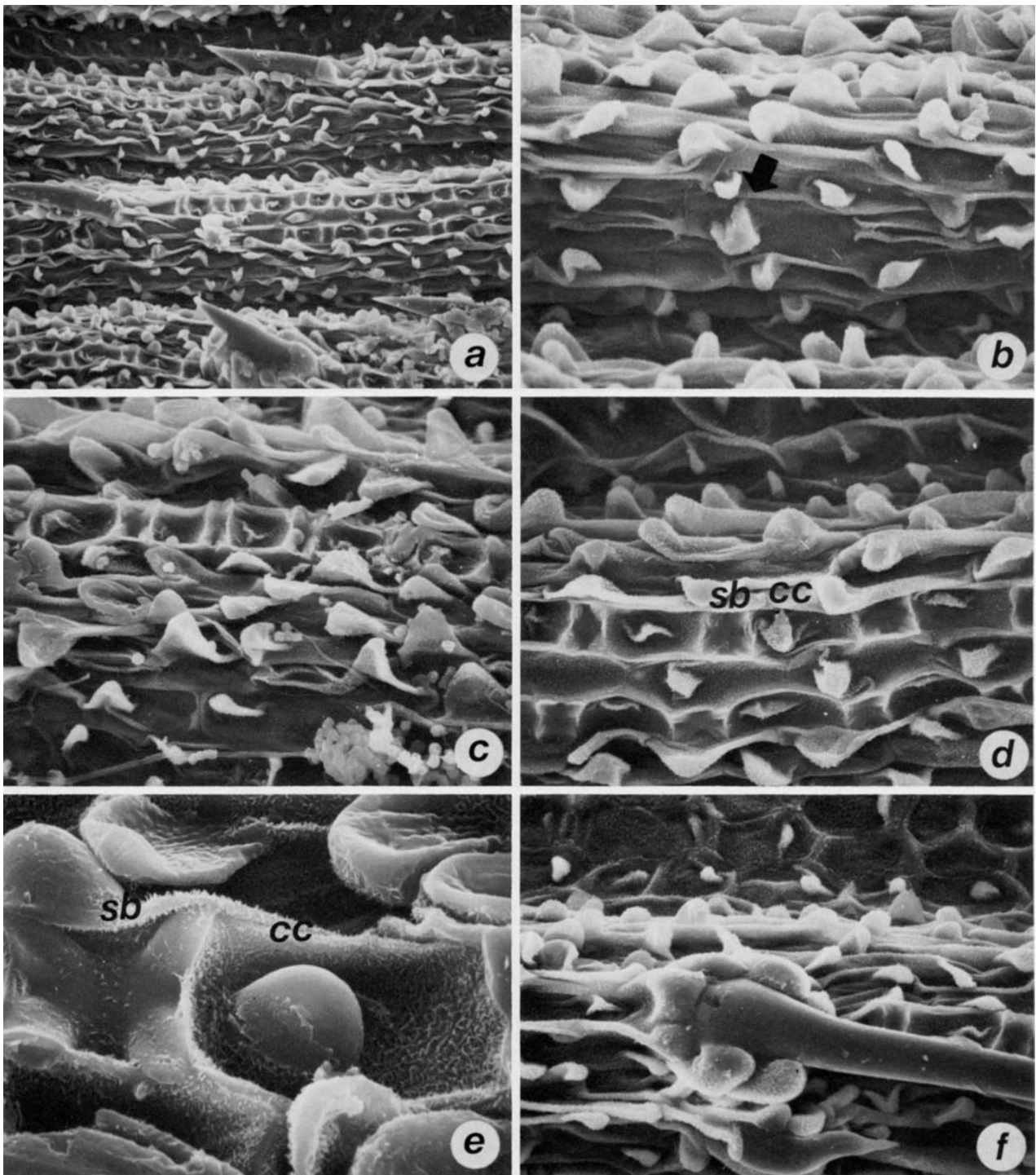


PLATE 16.—Adaxial epidermis *Heterantheroecia guineensis*, Davidse and Handlos 7217 (a–e), Simon and Williamson 1925 (f): a, overview, $\times 295$; b, stomata, interstomatal cell (arrow), $\times 867$; c, long cells, short cells, $\times 867$; d, costal silica bodies (sb), cork cells with deflated papillae (cc), $\times 867$; e, costal silica body (sb), papillate cork cell (cc), $\times 2970$; f, base of costal macrohair, $\times 867$.

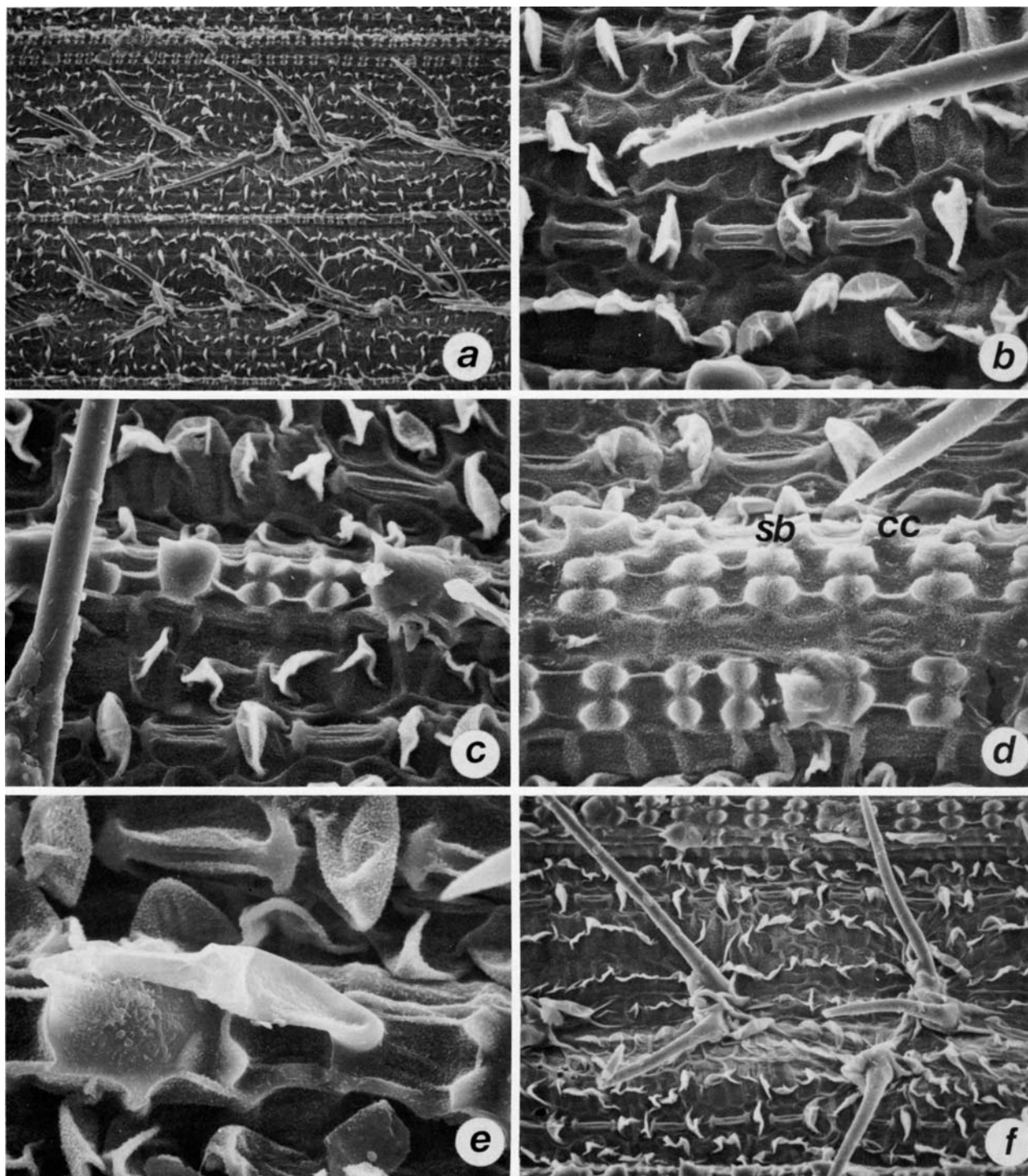


PLATE 17.—Abaxial epidermis *Isachne buettneri*, Baldwin 6718: *a*, overview showing distribution of macrohairs, $\times 150$; *b*, stomata, interstomatal cells, long cells, $\times 867$; *c*, long cells, costal prickles, short cells, $\times 867$; *d*, costal silica bodies (sb), cork cells (cc), $\times 867$; *e*, costal microhair, $\times 1696$; *f*, macrohairs, $\times 295$.

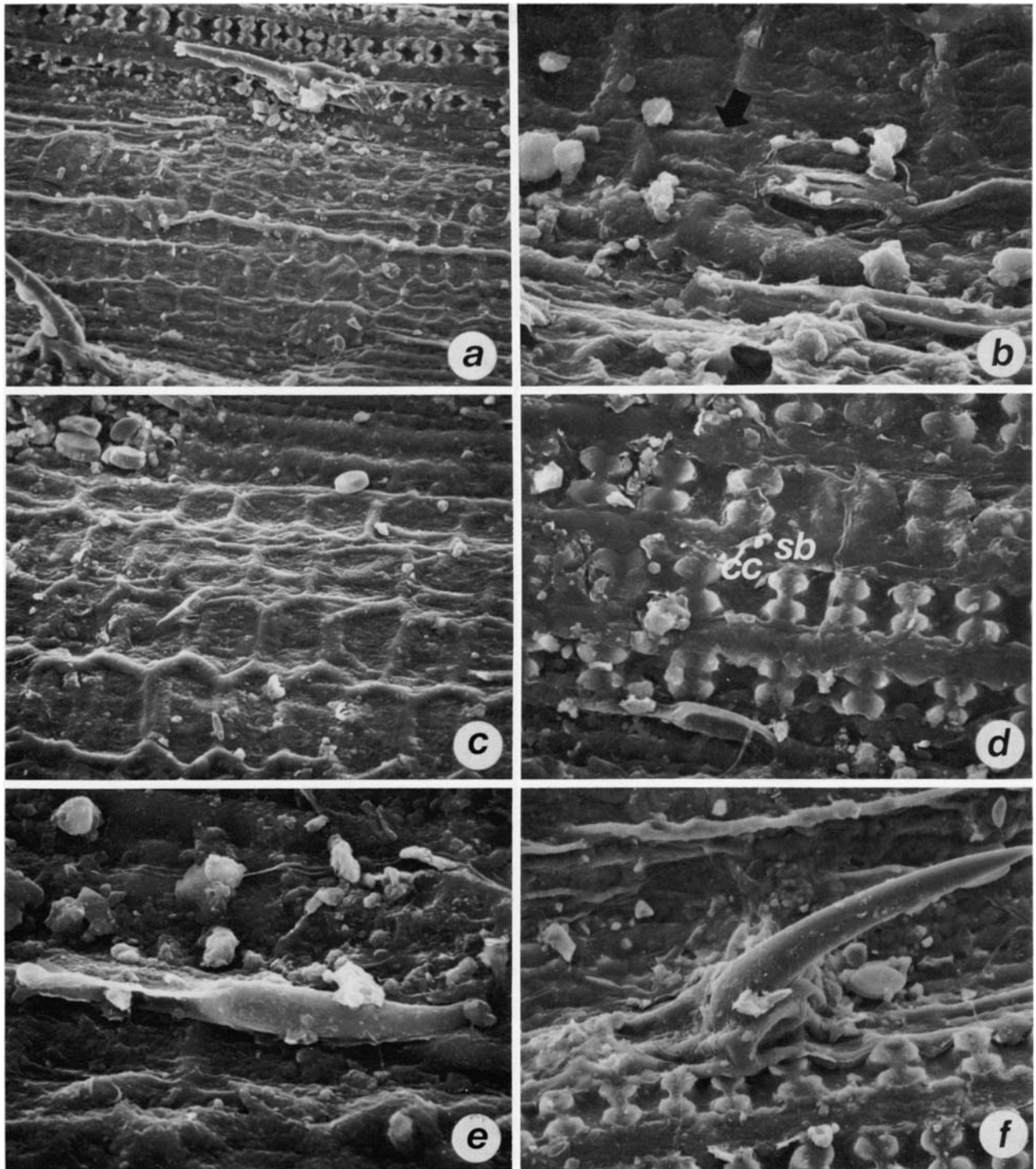


PLATE 18.—Adaxial epidermis *Isachne buettneri*, Baldwin 6718: *a*, overview, $\times 295$; *b*, stoma, interstomatal cell (arrow), $\times 1285$; *c*, long cells, $\times 625$; *d*, costal silica bodies (sb), cork cells (cc), $\times 867$; *e*, microhair, $\times 1696$; *f*, macrohair, $\times 640$.

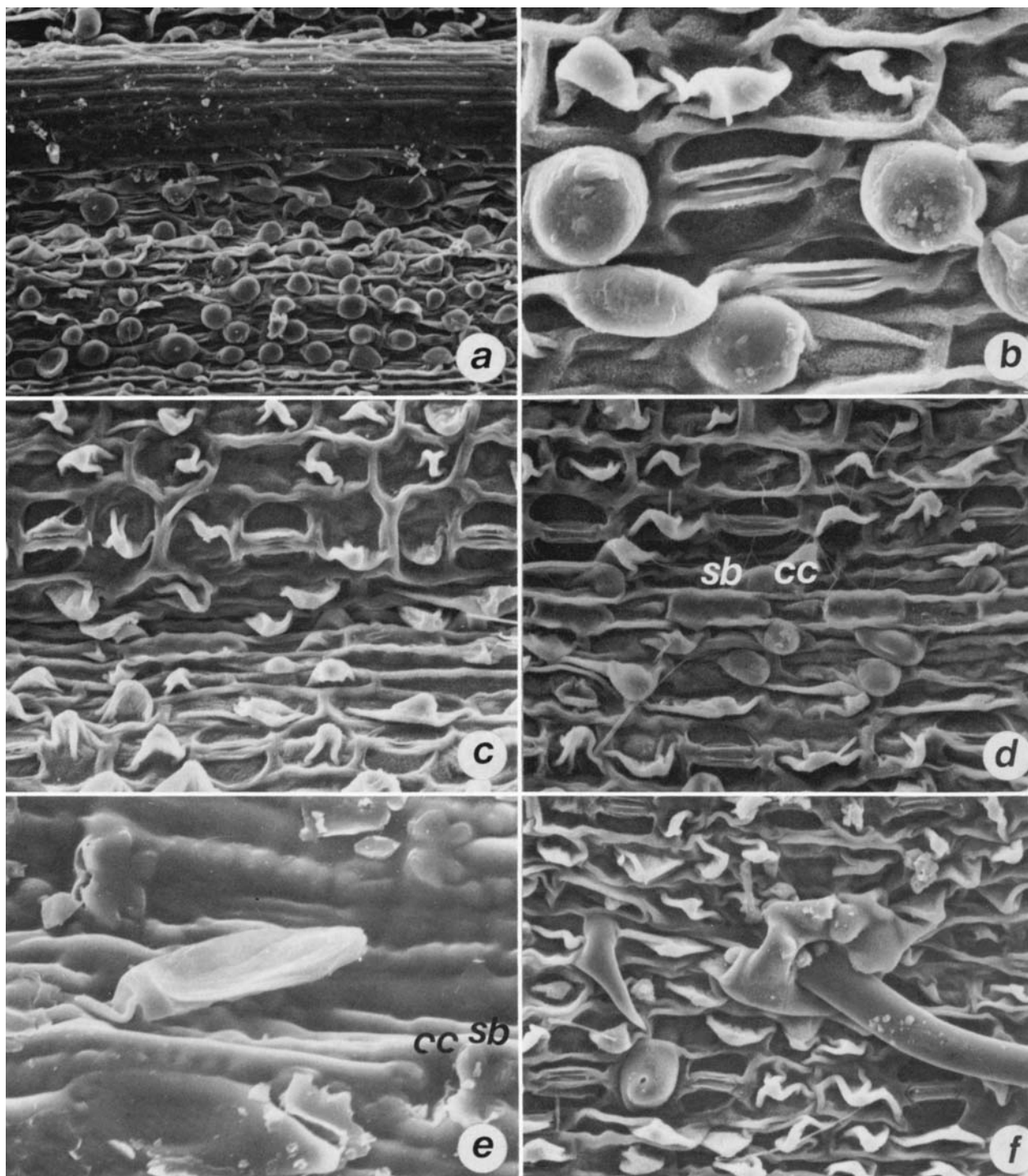


PLATE 19.—Abaxial epidermis *Acritochaete volkensis*, Davidse 7008: *a*, overview, $\times 320$; *b*, stomata, $\times 1250$; *c*, interstomatal cells, long cells, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, midvein silica bodies (sb), cork cells (cc), $\times 1250$; *f*, intercostal prickle (arrow), base of macrohair, $\times 640$.

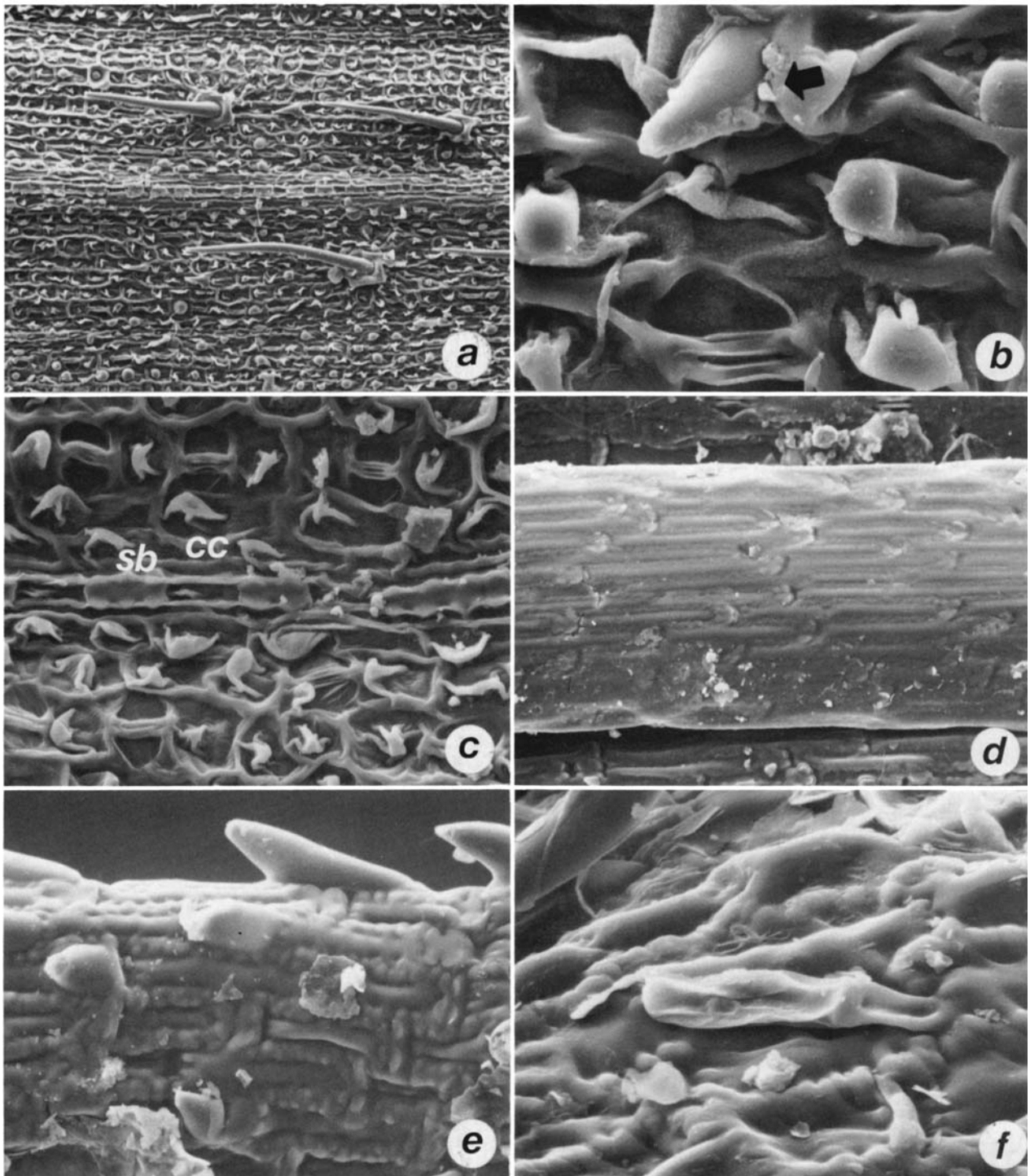


PLATE 20.—Adaxial epidermis *Acritochaete volkensis*, Davidse 7008: *a*, overview, macrohairs, $\times 160$; *b*, stoma, prickles (arrow), $\times 1500$; *c*, interstomatal cells, long cells, costal silica bodies (sb), cork cells (cc), $\times 640$; *d*, midvein silica bodies, cork cells, $\times 320$; *e*, marginal prickles, short cells, $\times 640$; *f*, microhair, $\times 1250$.

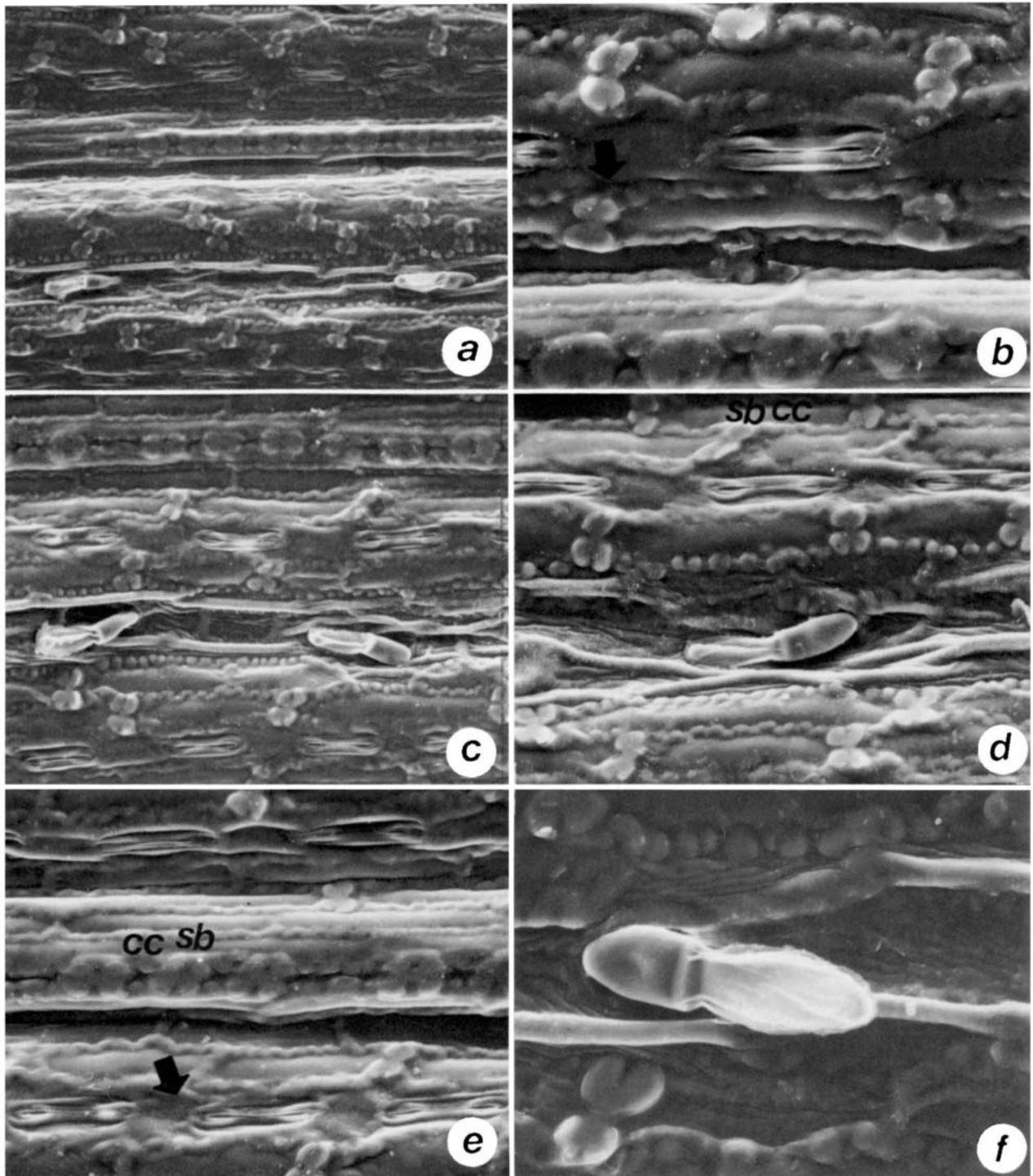


PLATE 21.—Abaxial epidermis *Acroceras zizanioides*, Reekmans 4864: *a*, overview, $\times 240$; *b*, stoma, intercostal silica bodies (arrow), $\times 640$; *c*, interstomatal cells, long cells, $\times 320$; *d*, intercostal silica bodies (sb), cork cells (cc), $\times 480$; *e*, interstomatal cells (arrow), costal silica bodies (sb), cork cells (cc), $\times 480$; *f*, microhair, $\times 960$.

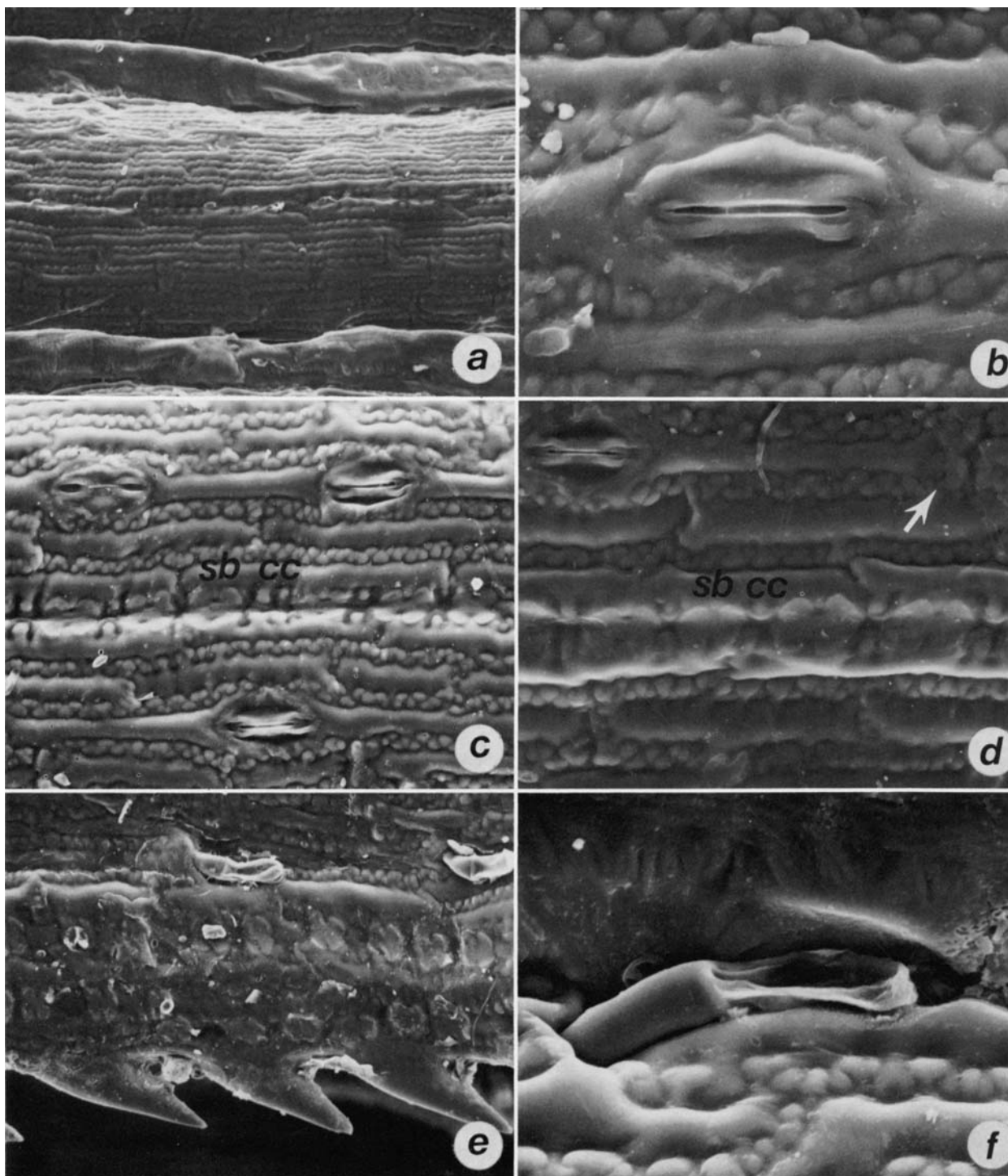


PLATE 22.—Adaxial epidermis *Acroceras zizanioides*, Reekmans 4864: *a*, overview, $\times 240$; *b*, stoma, $\times 1250$; *c*, interstomatal cells, long cells, costal silica bodies (sb), cork cells (cc), $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 640$; *e*, marginal prickles, $\times 320$; *f*, microhair, $\times 1250$.

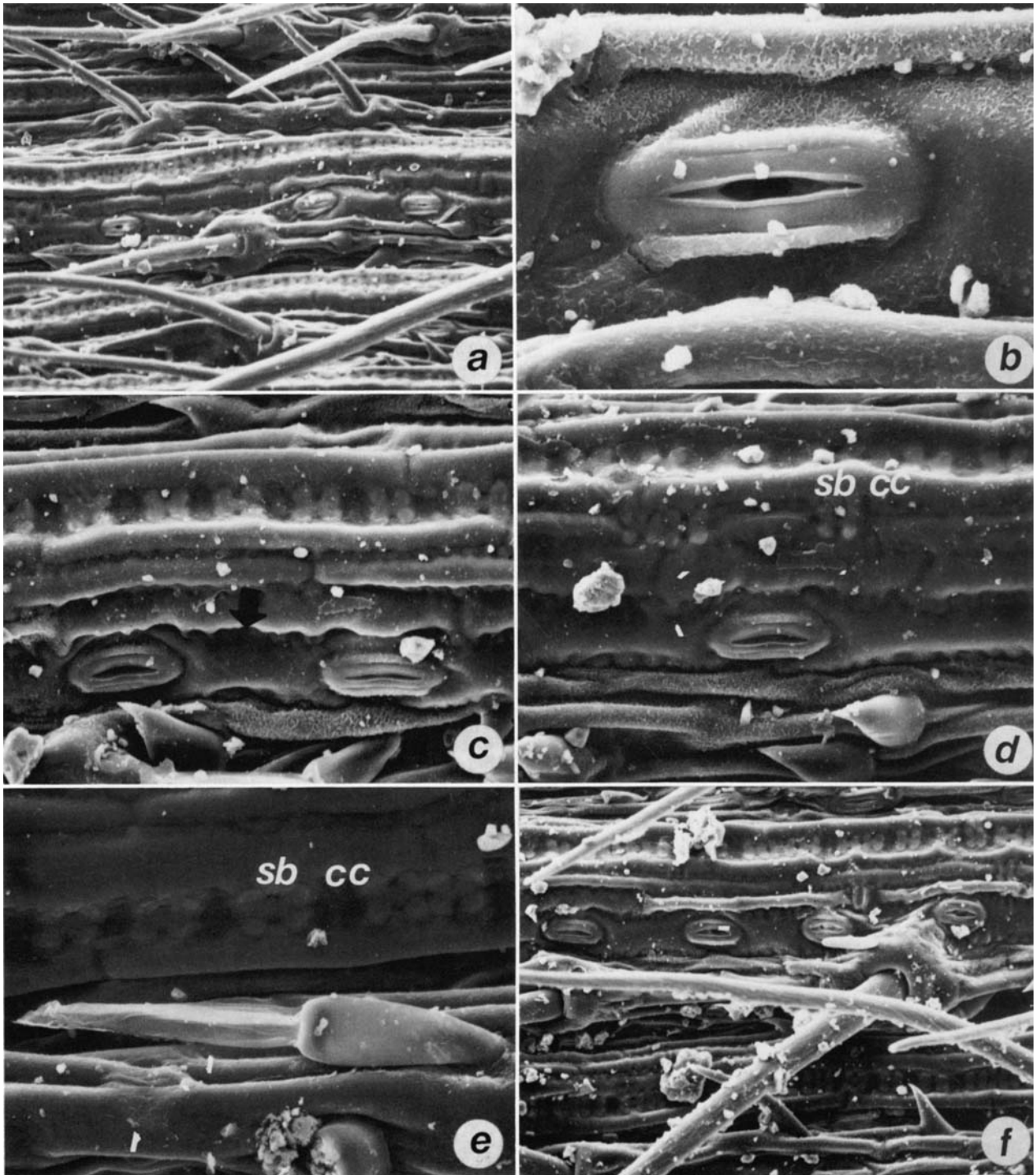


PLATE 23.—Abaxial epidermis *Alloteropsis angusta*, Hitchcock 24788: *a*, overview, $\times 240$; *b*, stoma, $\times 1625$; *c*, interstomatal cell (arrow), long cells, $\times 640$; *d*, intercostal silica bodies (sb), cork cell (cc), prickles, $\times 640$; *e*, costal silica bodies (sb), cork cells (cc), microhair, $\times 1875$; *f*, base of macrohair, $\times 320$.

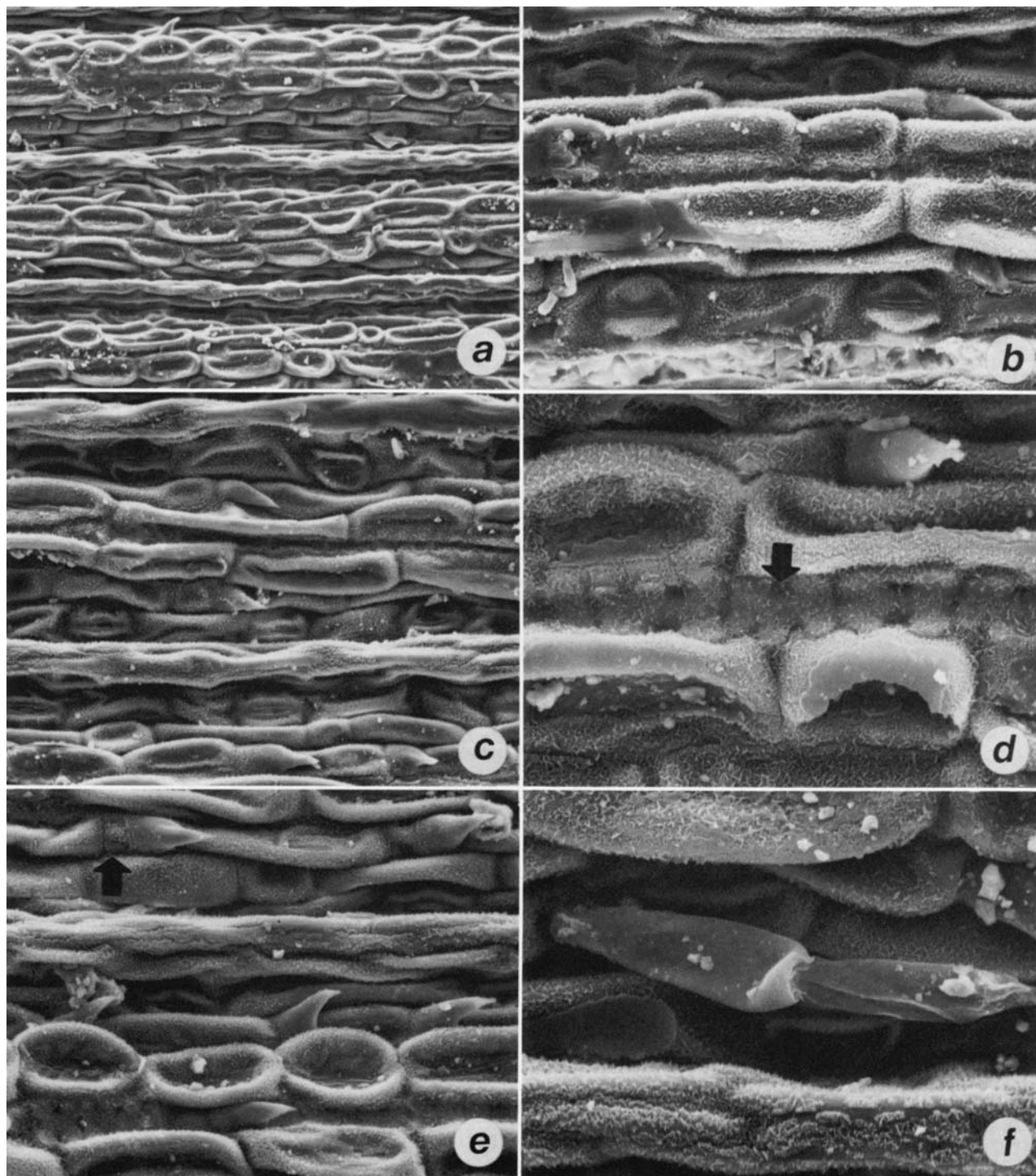


PLATE 24.—Adaxial epidermis *Alloteropsis angusta*, Hitchcock 24788: *a*, overview, $\times 240$; *b*, stomata, interstomatal cell, $\times 640$; *c*, interstomatal cells, long cells, $\times 480$; *d*, intercostal hook, costal silica bodies (arrow), $\times 1250$; *e*, costal and intercostal hooks, intercostal cork cell (arrow), $\times 640$; *f*, microhair, $\times 1250$.

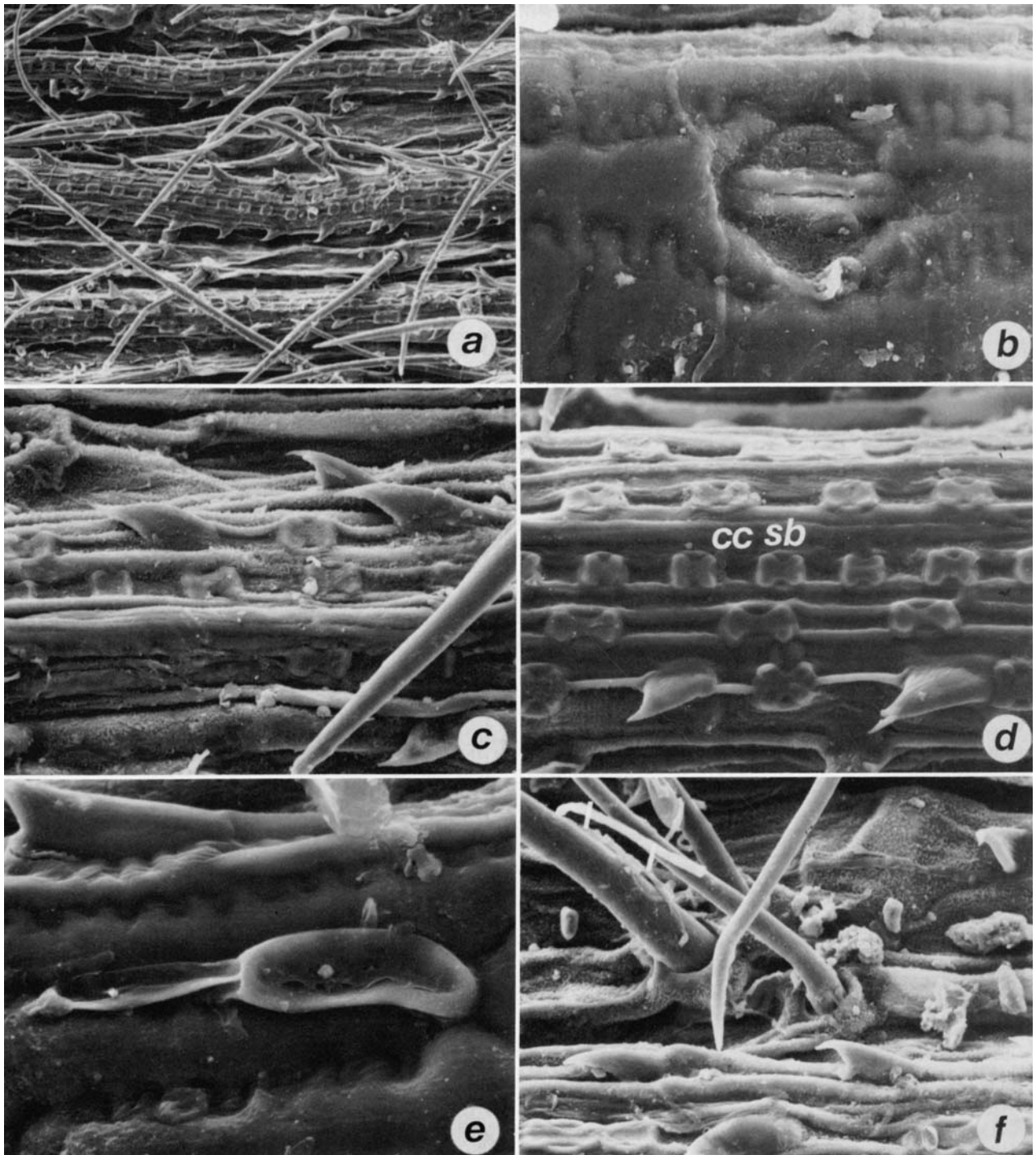


PLATE 25.—Abaxial epidermis *Anthephora elongata*, Adamson 10: *a*, overview, $\times 160$; *b*, stoma, long cells, $\times 1250$; *c*, long cells, costal and intercostal prickles, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, $\times 1250$; *f*, bases of macrohairs, $\times 640$.

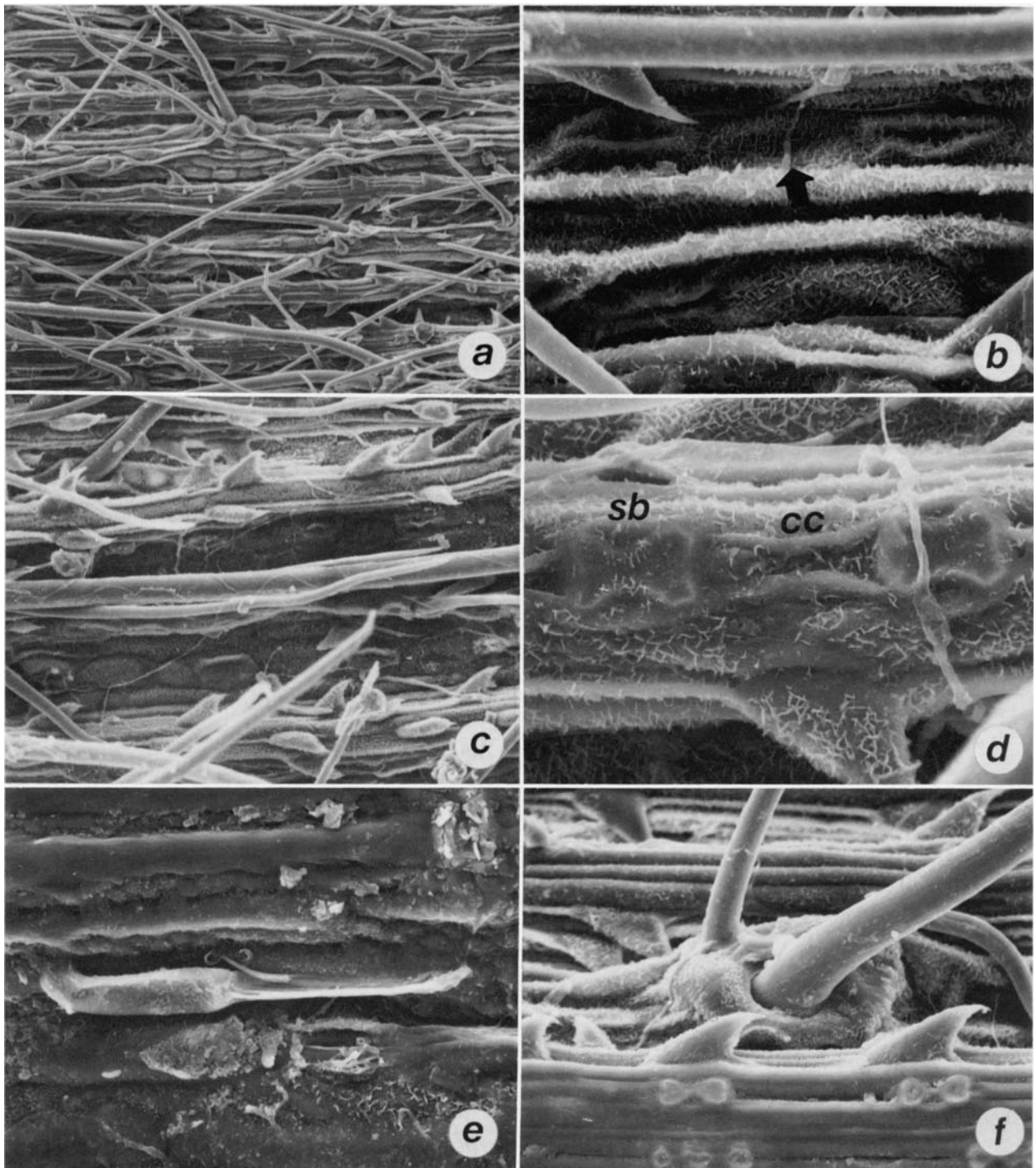


PLATE 26.—Adaxial epidermis *Anthephora elongata*, Adamson 10: *a*, overview, $\times 160$; *b*, stomata, interstomatal cells, $\times 960$; *c*, interstomatal cells, long cells, costal and intercostal prickles, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 1500$; *e*, microhair, $\times 960$; *f*, base of macrohair, $\times 640$.

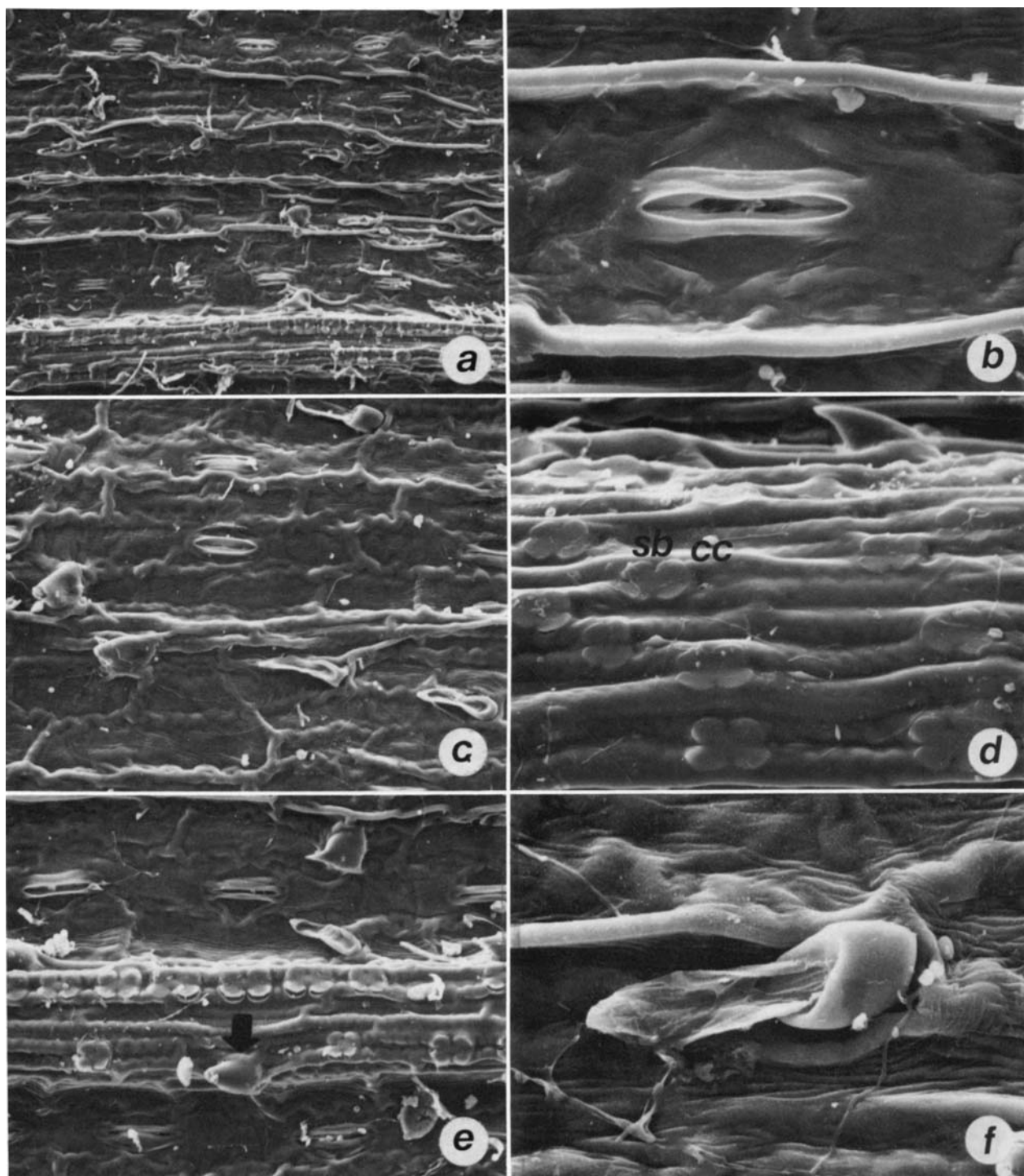


PLATE 27.—Abaxial epidermis *Axonopus flexuosus*, Trapnell 1701: *a*, overview, $\times 160$; *b*, stoma, $\times 960$; *c*, interstomatal cells, long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, costal prickle (arrow), intercostal hooks, $\times 320$; *f*, microhair, $\times 1250$.

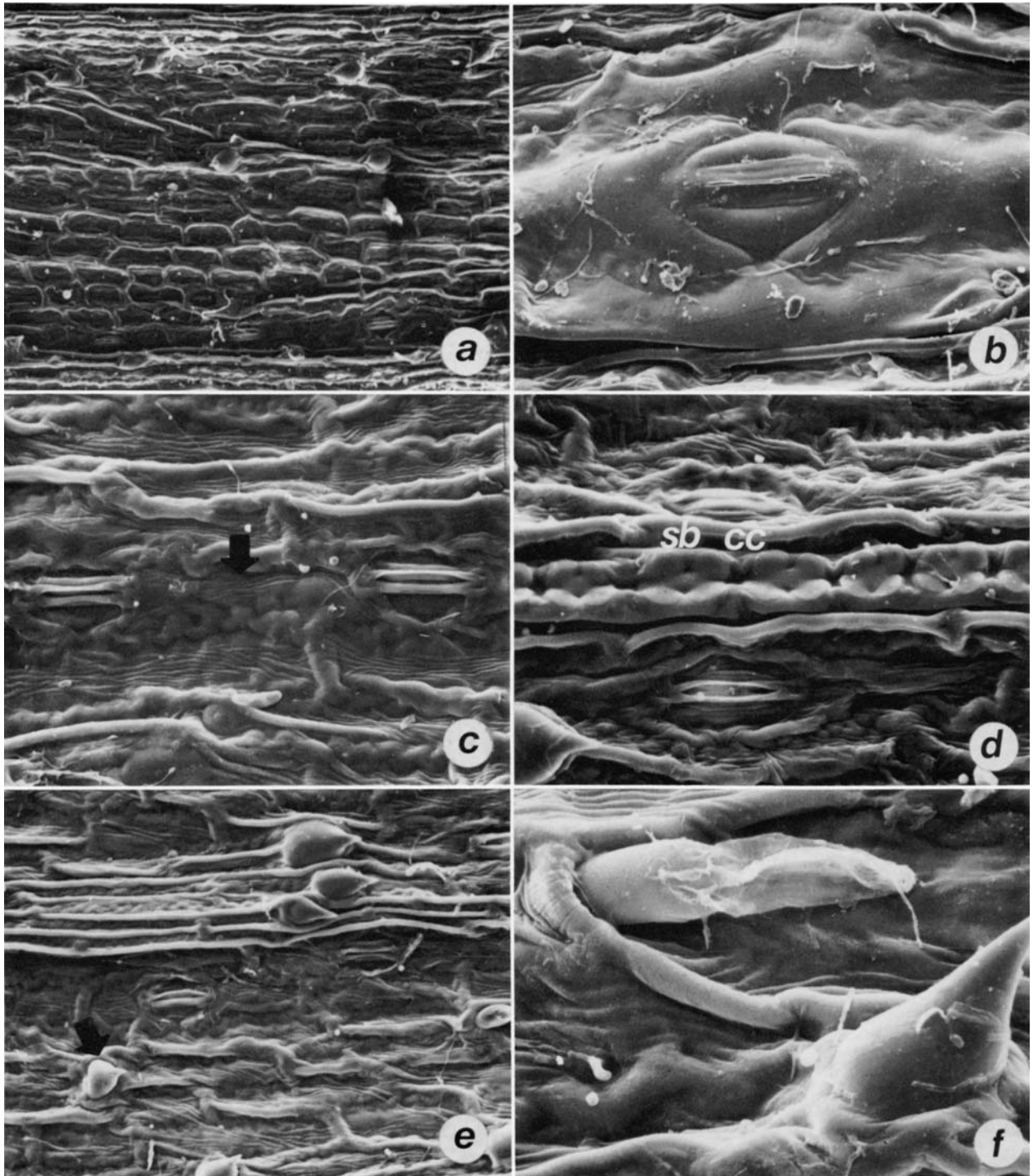


PLATE 28.—Adaxial epidermis *Axonopus flexuosus*, Trapnell 1701: *a*, overview, $\times 180$; *b*, stoma, $\times 640$; *c*, interstomatal cell (arrow), long cells, $\times 544$; *d*, costal silica bodies (sb), cork cells (cc), $\times 1250$; *e*, costal prickles, intercostal hooks (arrow), $\times 320$; *f*, microhair, $\times 1250$.

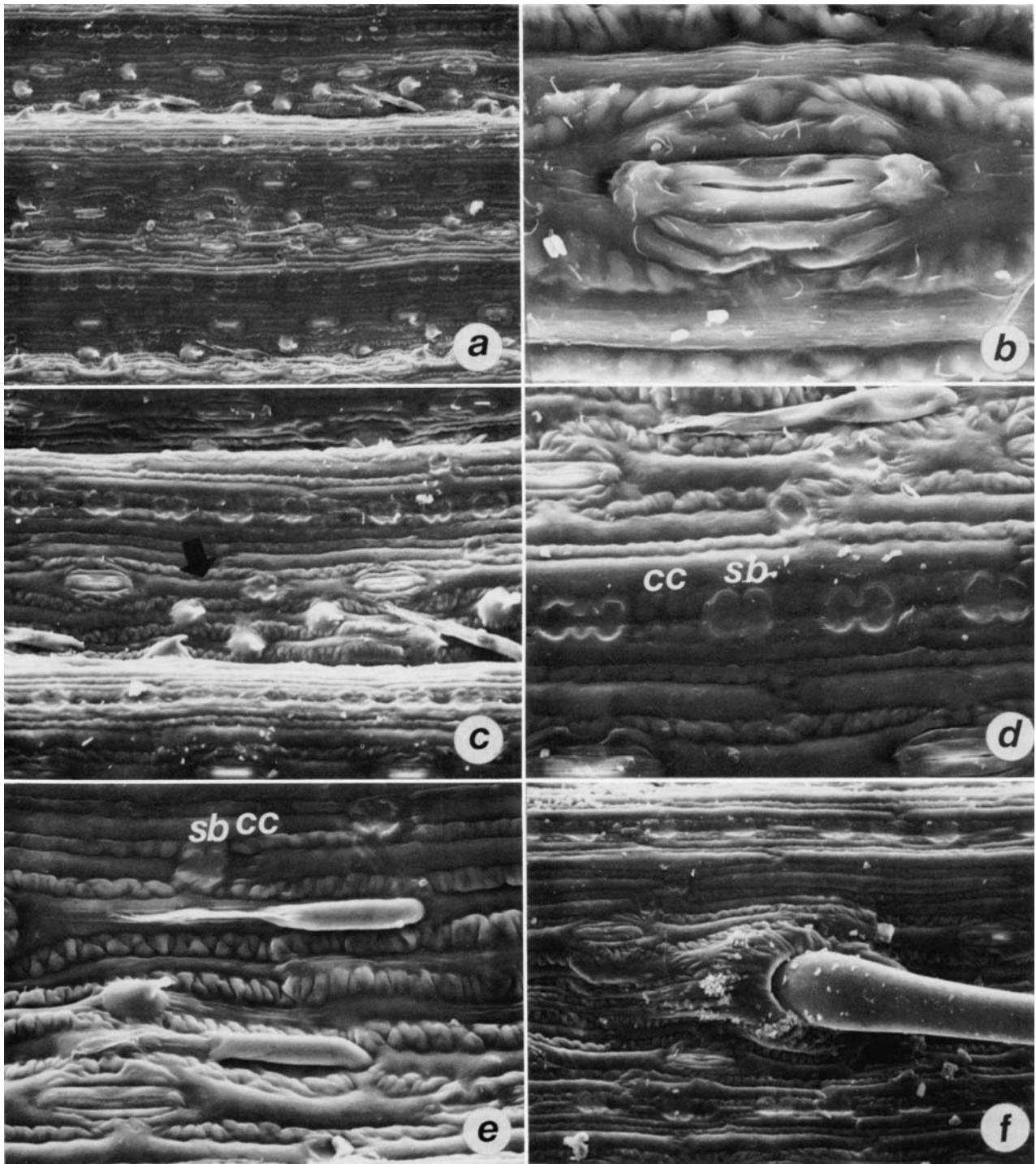


PLATE 29.—Abaxial epidermis *Brachiaria brizantha*, Hitchcock 24884: *a*, overview, $\times 160$; *b*, stoma, $\times 1250$; *c*, interstomatal cells (arrow), long cells, $\times 320$; *d*, interstomatal cell, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, intercostal silica bodies (sb), cork cells (cc), microhairs, hook (arrow), $\times 640$; *f*, base of macrohair, $\times 320$.

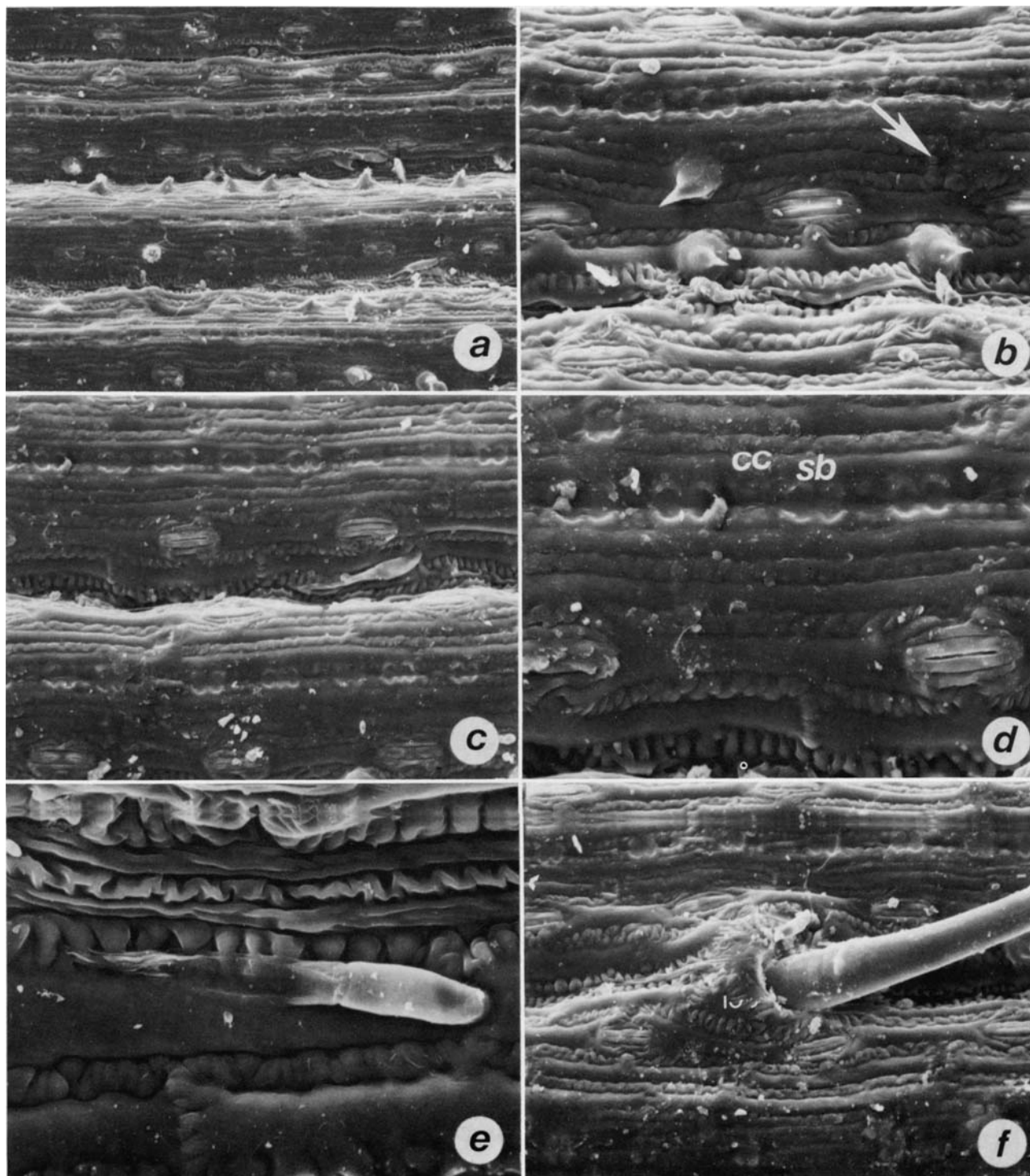


PLATE 30.—Adaxial epidermis *Brachiaria brizantha*, Hitchcock 24884: *a*, overview, $\times 160$; *b*, stomata, interstomatal cells, intercostal hooks, intercostal cork cell (arrow), $\times 480$; *c*, interstomatal cells, long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, $\times 960$; *f*, base of macrohair, $\times 320$.

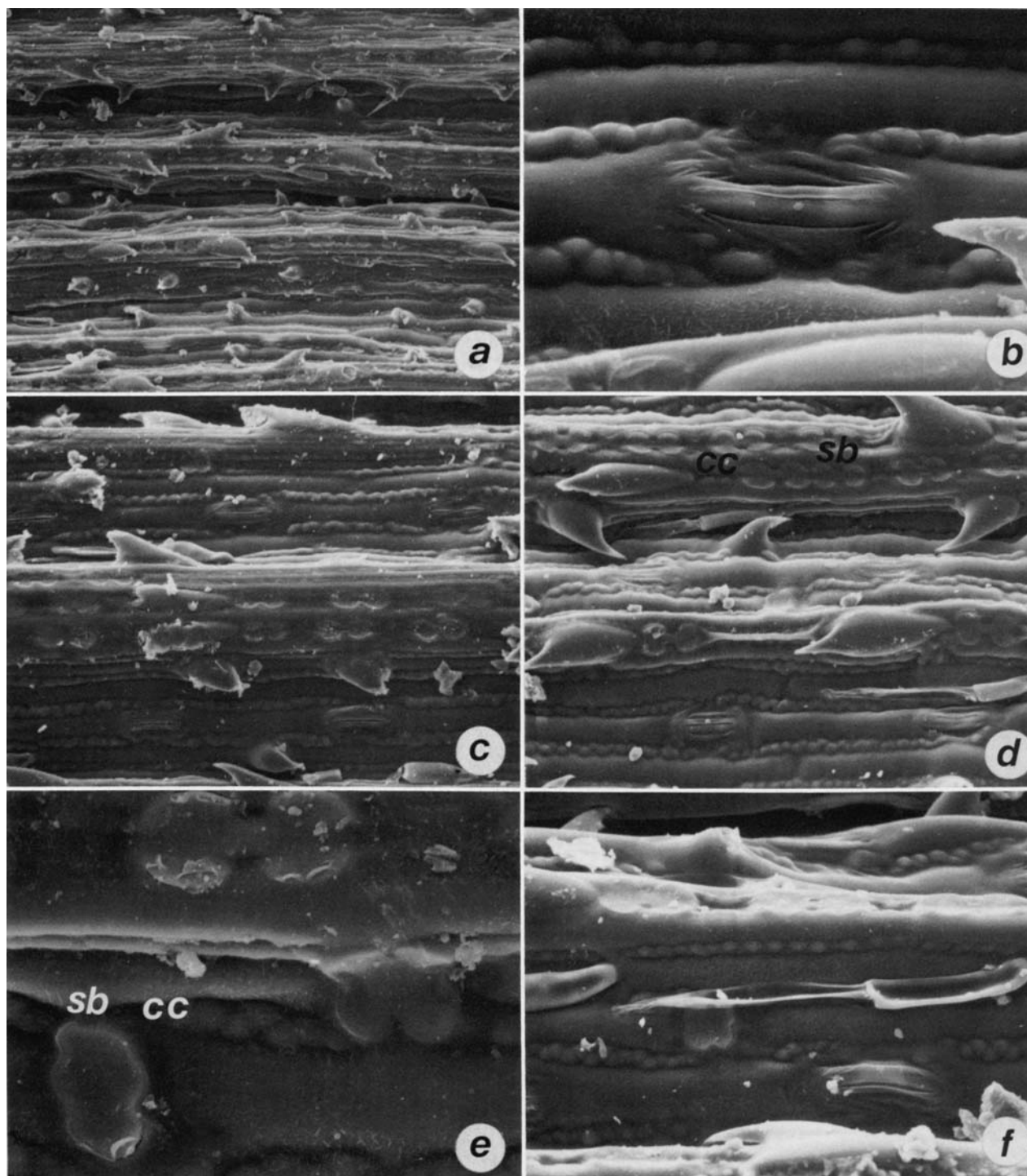


PLATE 31.—Abaxial epidermis *Cenchrus ciliaris*, Bogdan 2242: *a*, overview, $\times 160$; *b*, stoma, $\times 1250$; *c*, interstomatal cells, long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), costal and intercostal prickles, $\times 384$; *e*, intercostal silica body (sb), cork cell (cc), $\times 1500$; *f*, microhair, $\times 680$.

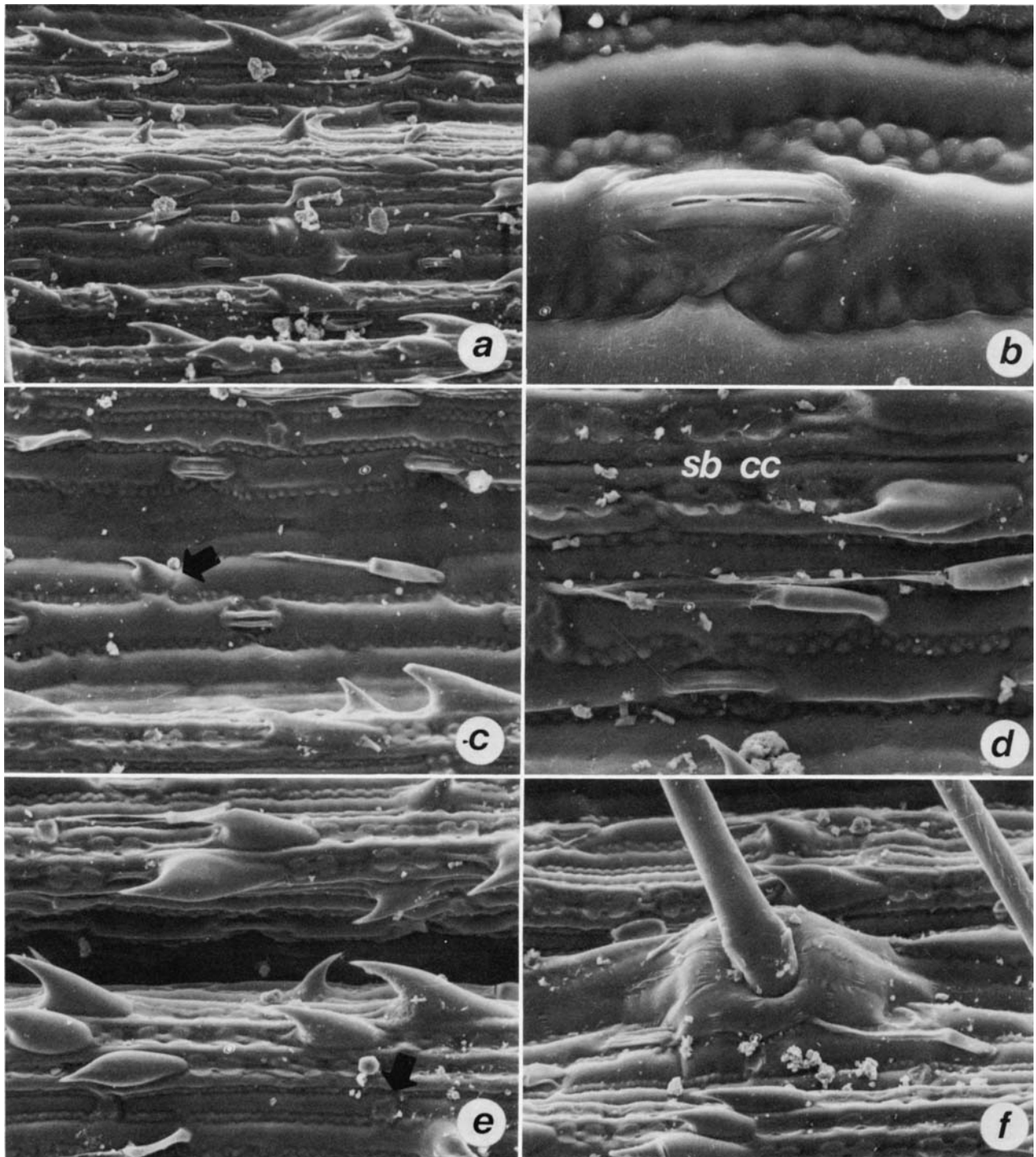


Plate 32.—Adaxial epidermis *Cenchrus ciliaris*, Bogdan 2242: *a*, overview, $\times 208$; *b*, stoma, $\times 1250$; *c*, interstomatal cells, long cells, intercostal hook (arrow), $\times 320$; *d*, costal prickles, costal silica bodies (sb), cork cells (cc), microhair, $\times 544$; *e*, intercostal silica bodies (arrow), $\times 320$; *f*, base of macrohair, $\times 320$.

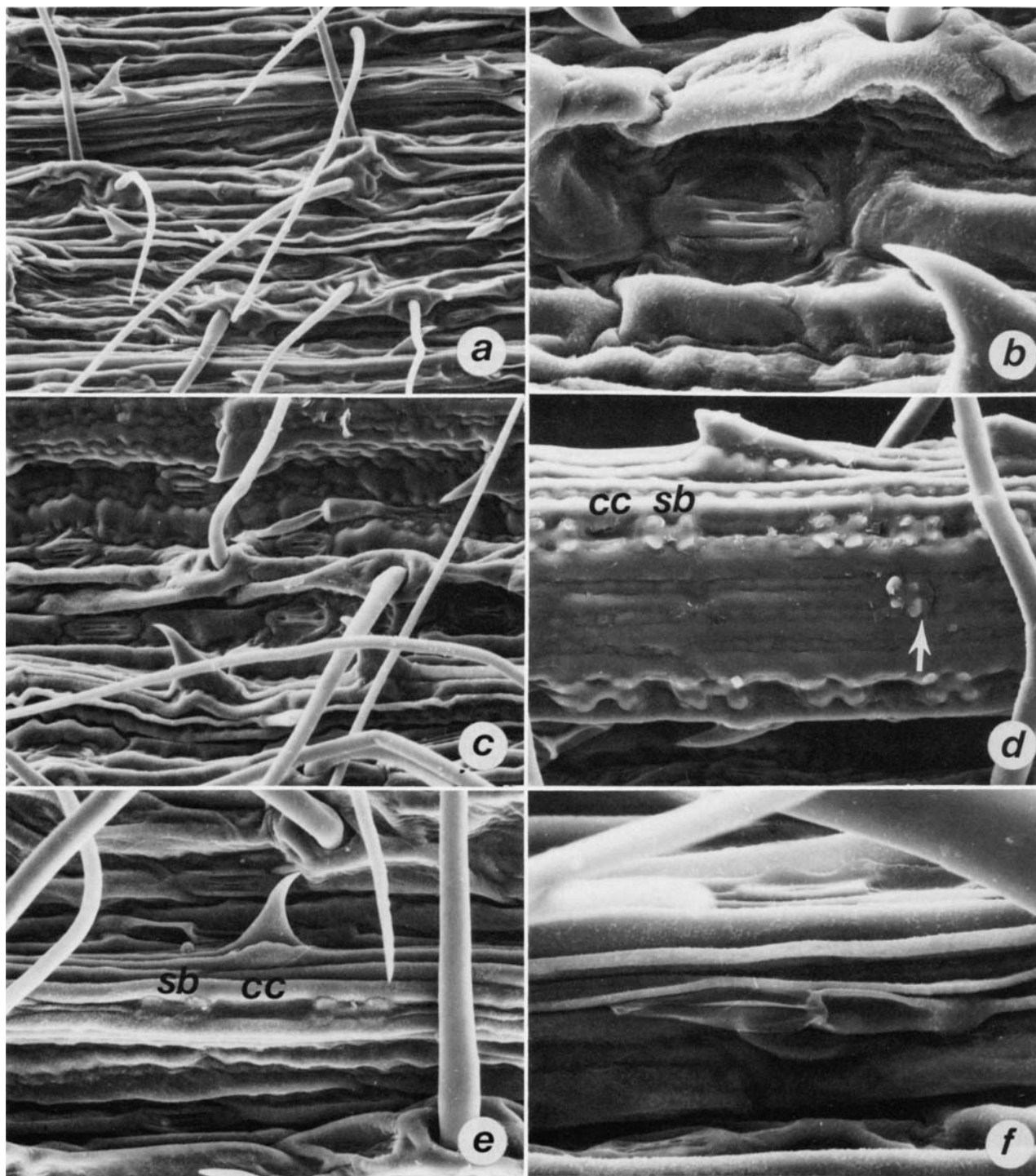


PLATE 33.—Abaxial epidermis *Chaetopoa taylori*, Milne-Redhead and Taylor 9684: *a*, overview, short macrohairs, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cells, long cells, $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), intercostal short cells (arrow), $\times 640$; *e*, base of macrohair, costal silica bodies (sb), cork cells (cc), $\times 640$; *f*, microhair, $\times 1250$.

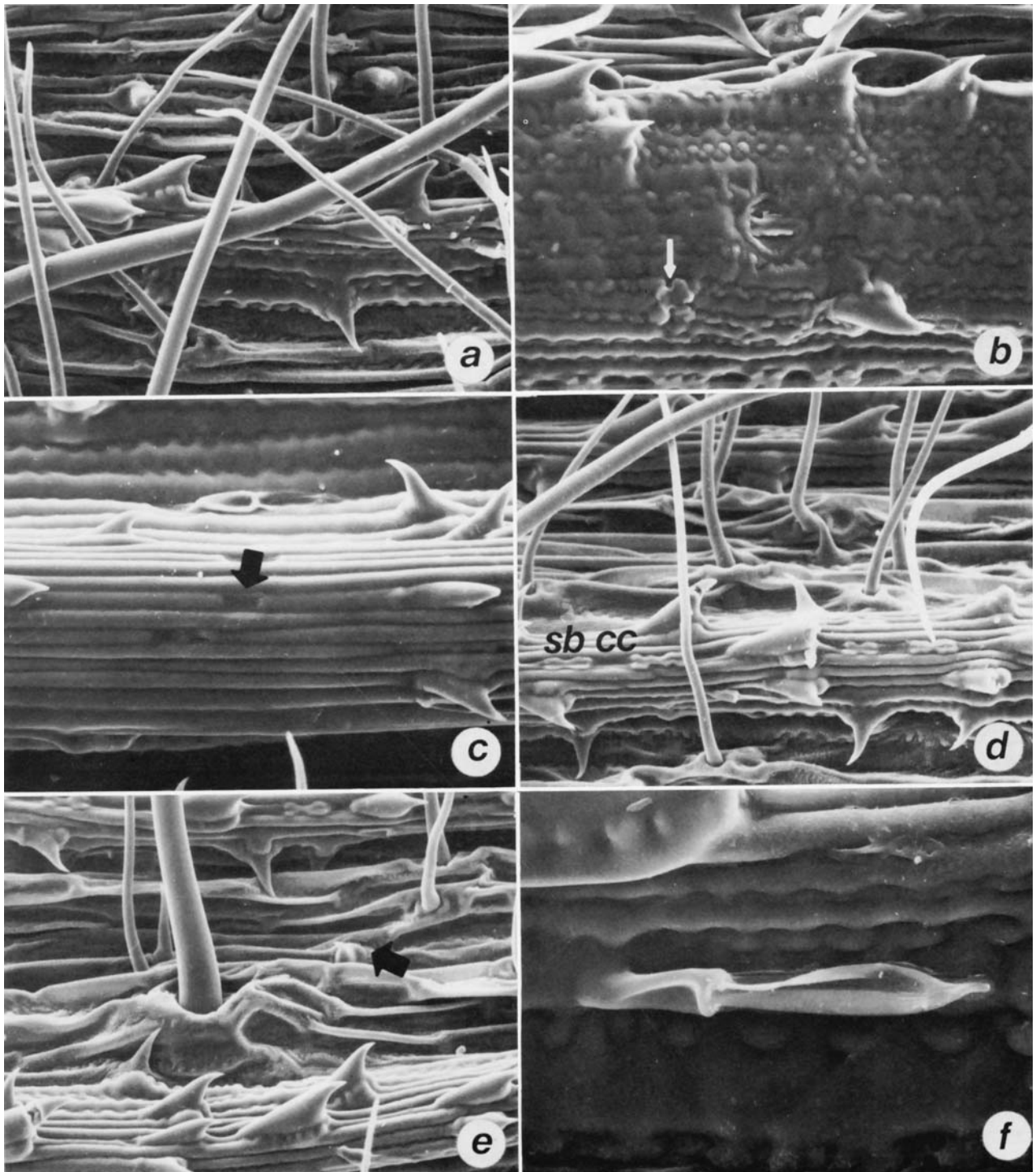


PLATE 34.—Adaxial epidermis *Chaetopoa taylori*, Milne-Redhead and Taylor 9684: *a*, overview, $\times 320$; *b*, stoma, long cells, intercostal silica cell (arrow), $\times 480$; *c*, costal cork cells (arrow), long cells, $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), $\times 320$; *e*, costal prickles, intercostal hook (arrow), base of macrohair, short macrohairs, $\times 320$; *f*, microhair, $\times 1250$.

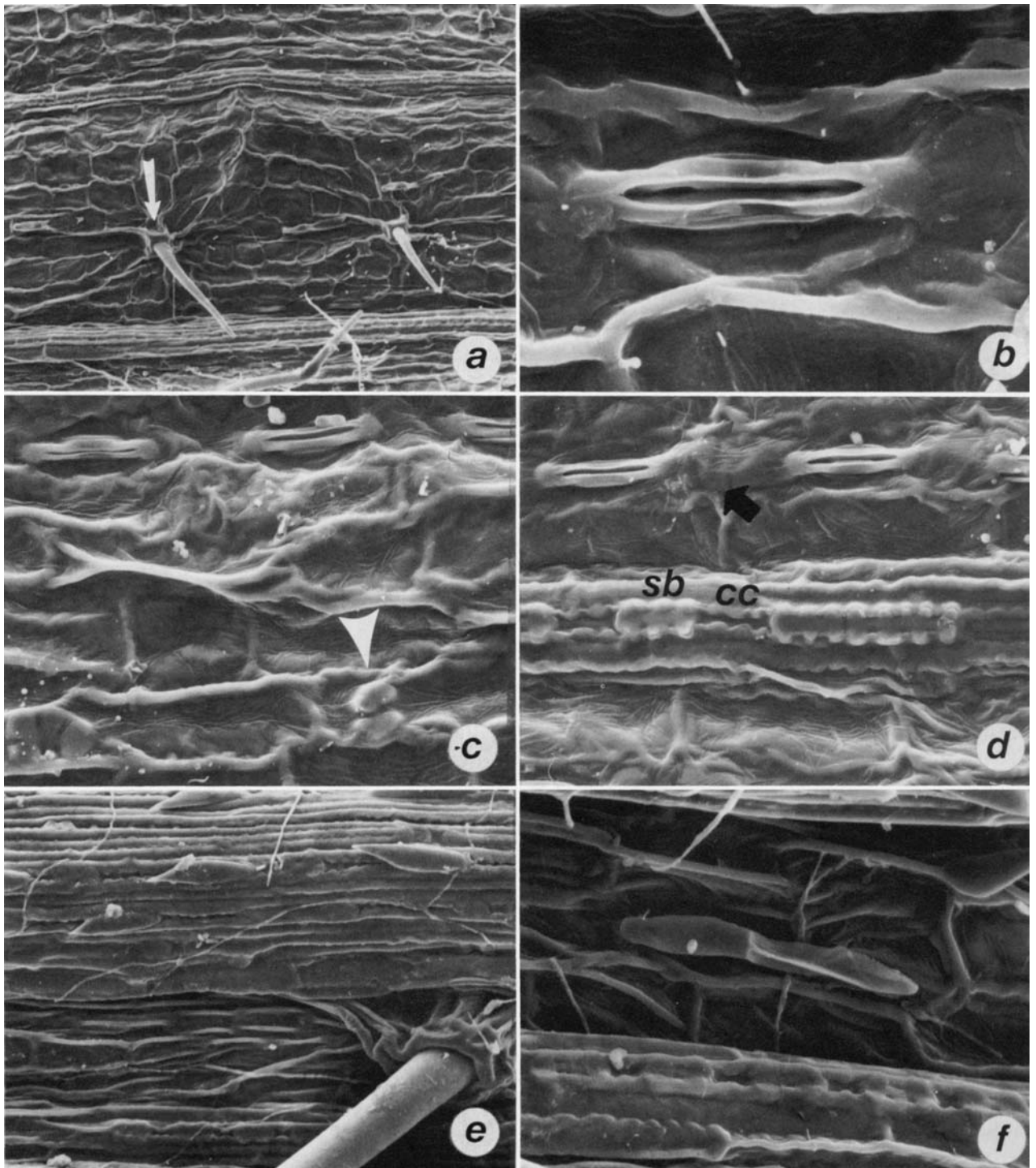


PLATE 35.—Abaxial epidermis *Chloachne oplismenoides*, Brenan, Jones, Richards 9551: *a*, overview, intercostal short macrohairs (arrow), $\times 160$; *b*, stoma, $\times 1625$; *c*, intercostal silica bodies (arrow), long cells, $\times 640$; *d*, interstomatal cell (arrow), costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, prickles on midvein, base of macrohair, $\times 320$; *f*, microhair, $\times 640$.

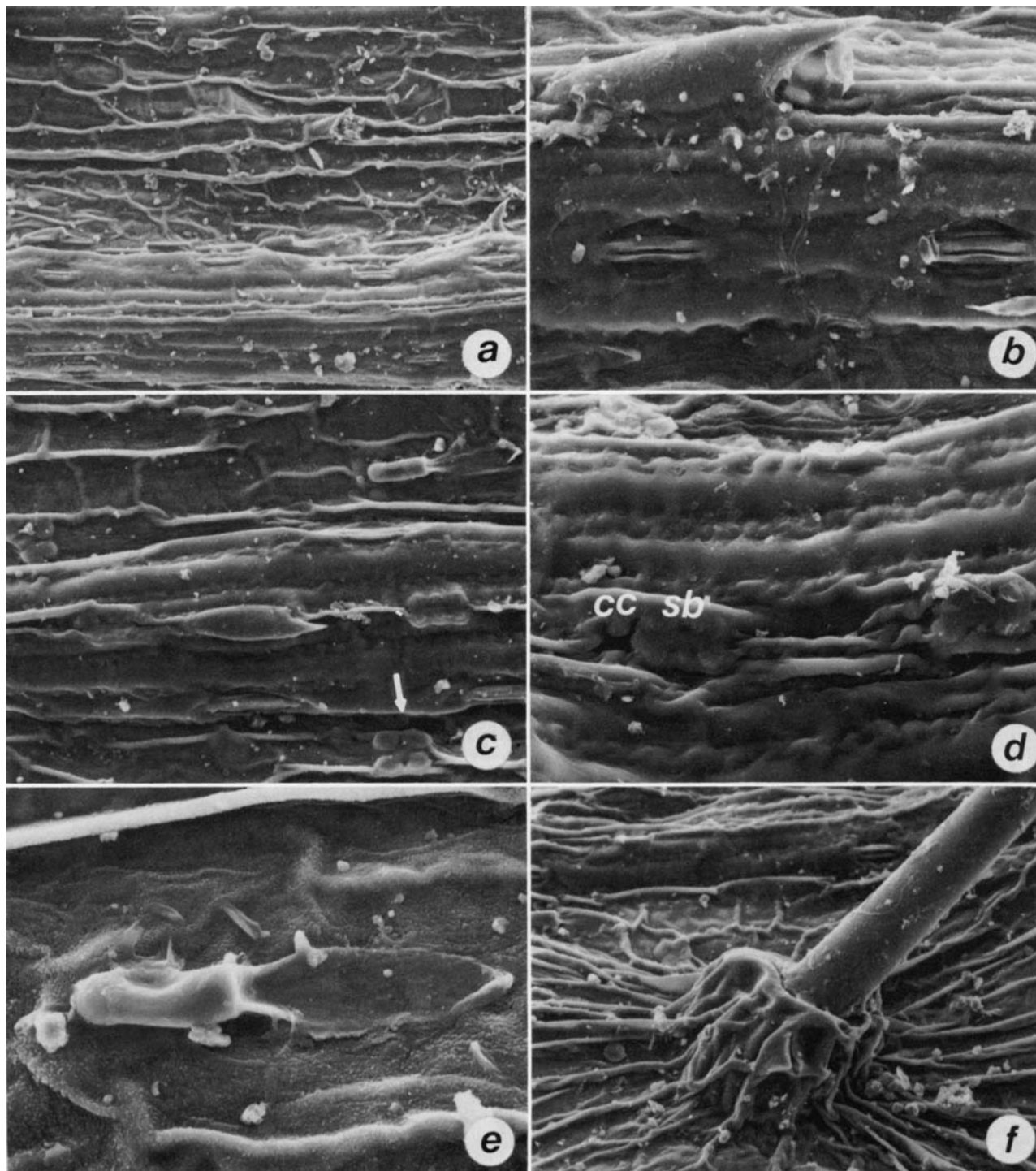


PLATE 36.—Adaxial epidermis *Chloachne oplismenoides*, Brenan, Jones, Richards 9551: *a*, overview, long cells, $\times 240$; *b*, stomata, interstomatal cell, costal pricklet, $\times 640$; *c*, costal pricklet, intercostal silica body (arrow), $\times 480$; *d*, long cells, costal silica bodies (sb), cork cells (cc), $\times 960$; *e*, microhair, $\times 1250$; *f*, base of macrohair, $\times 320$.

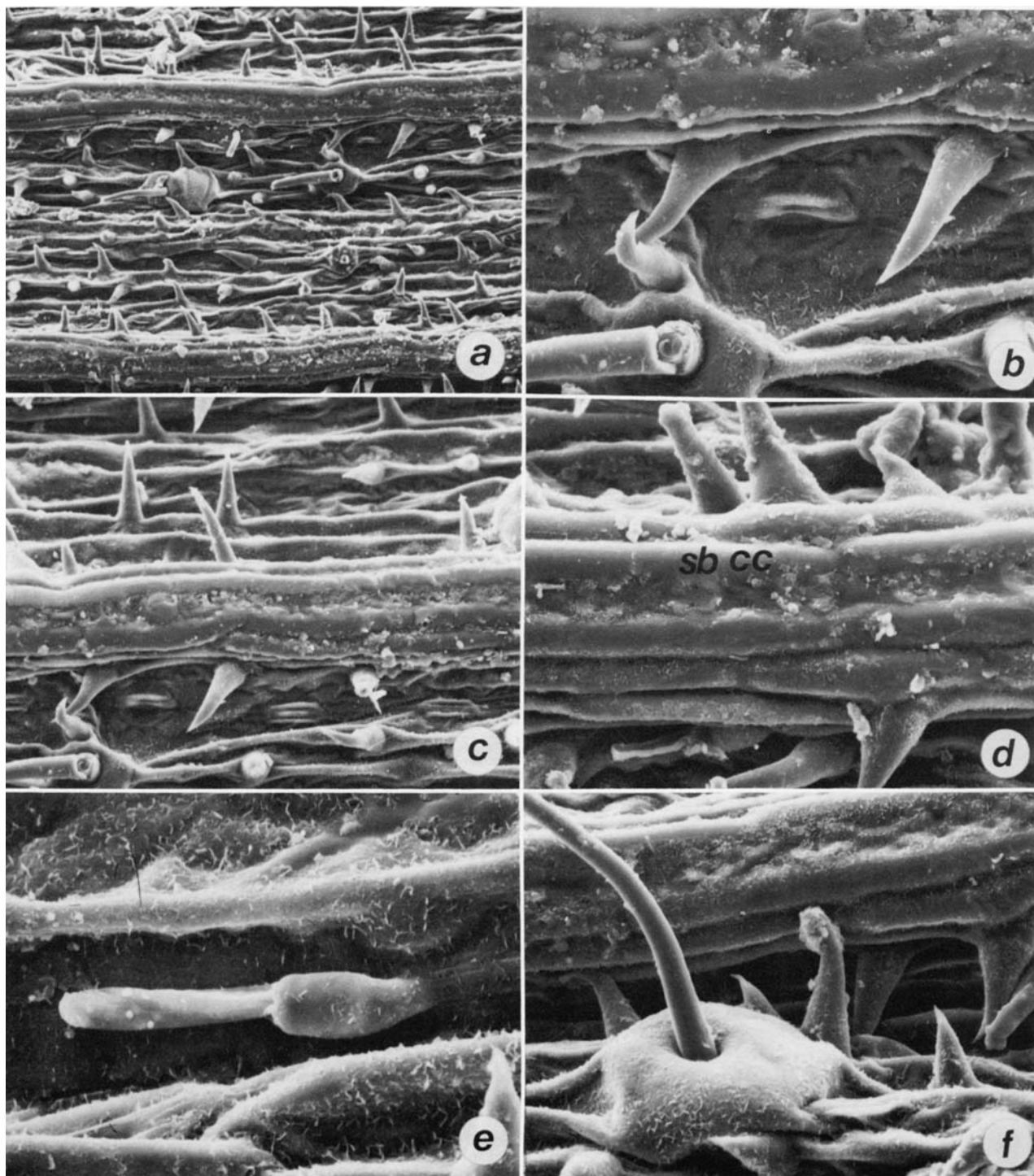


PLATE 37.—Abaxial epidermis *Chlorocalymma cryptacanthum*, Greenway and Kanuri 13980: *a*, overview, $\times 160$; *b*, stoma, interstomatal cells, $\times 640$; *c*, interstomatal cells, long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, $\times 1250$; *f*, base of macrohair, $\times 640$.

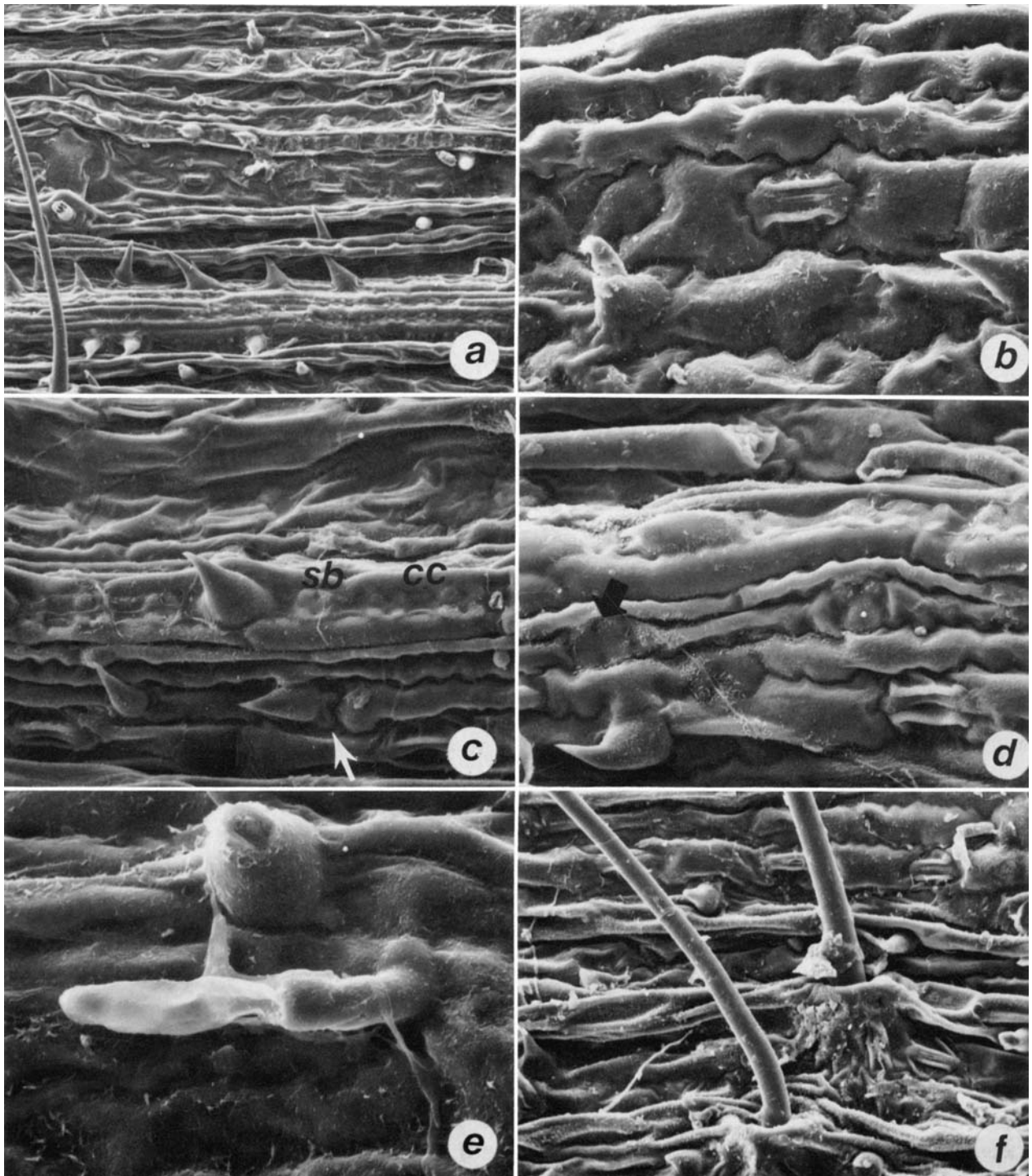


PLATE 38.—Adaxial epidermis *Chlorocalymma cryptacanthum*, Greenway and Kanuri 13980: *a*, overview, $\times 160$; *b*, stoma, interstomatal cells, long cells, $\times 640$; *c*, costal silica bodies (sb), cork cells (cc), intercostal cork cell (arrow), costal and intercostal prickles, $\times 480$; *d*, intercostal silica bodies (arrow), $\times 640$; *e*, microhair, $\times 1250$; *f*, macrohairs, $\times 320$.

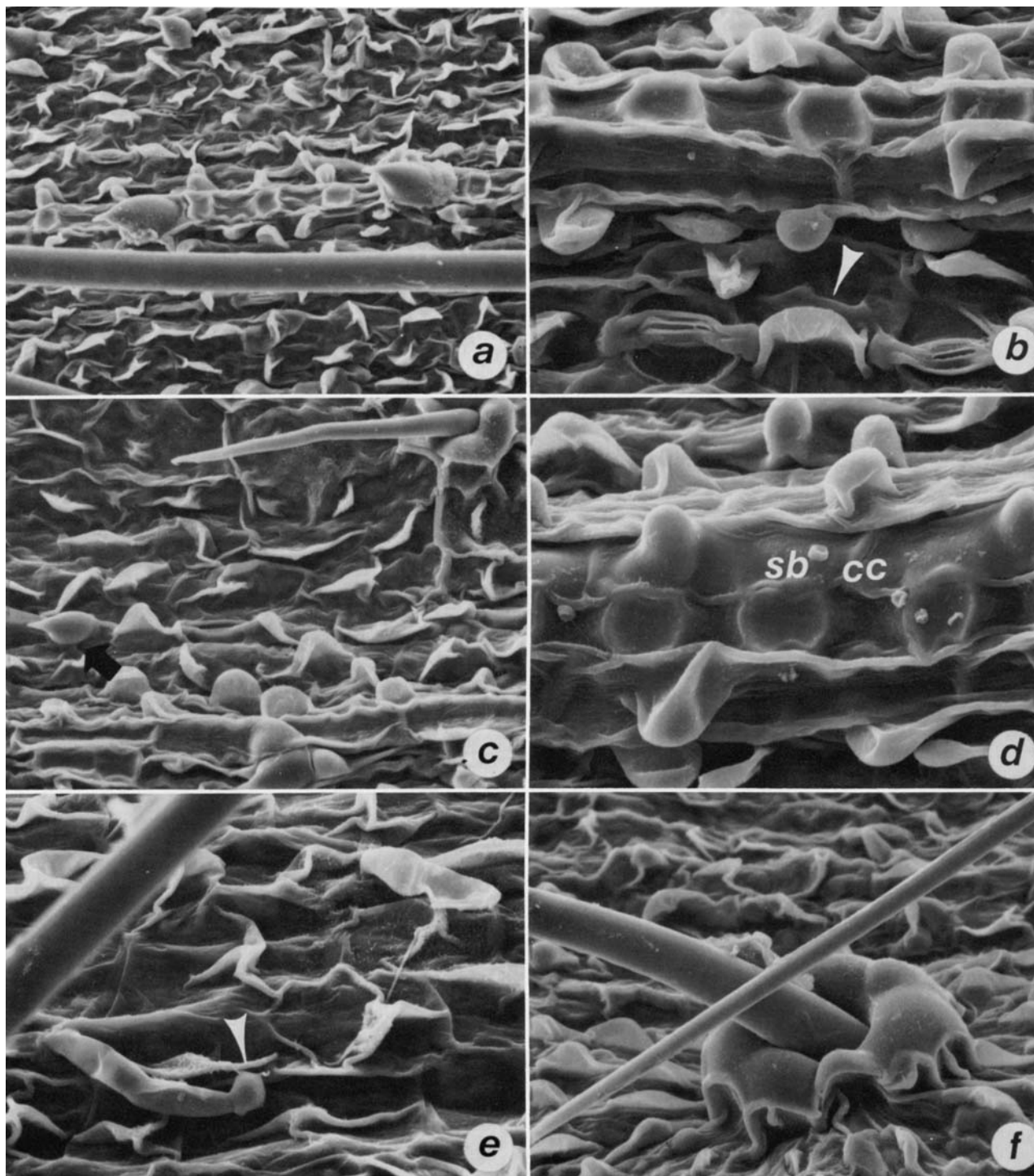


PLATE 39.—Abaxial epidermis *Cyrtococcum multinode*, Dawkins D571: *a*, overview, long cells, $\times 480$; *b*, stomata, interstomatal cell (arrow), $\times 1250$; *c*, long cells, intercostal prickly (arrow), $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 1250$; *e*, microhair with swollen tip (arrow), $\times 1024$; *f*, base of macrohair, $\times 640$.

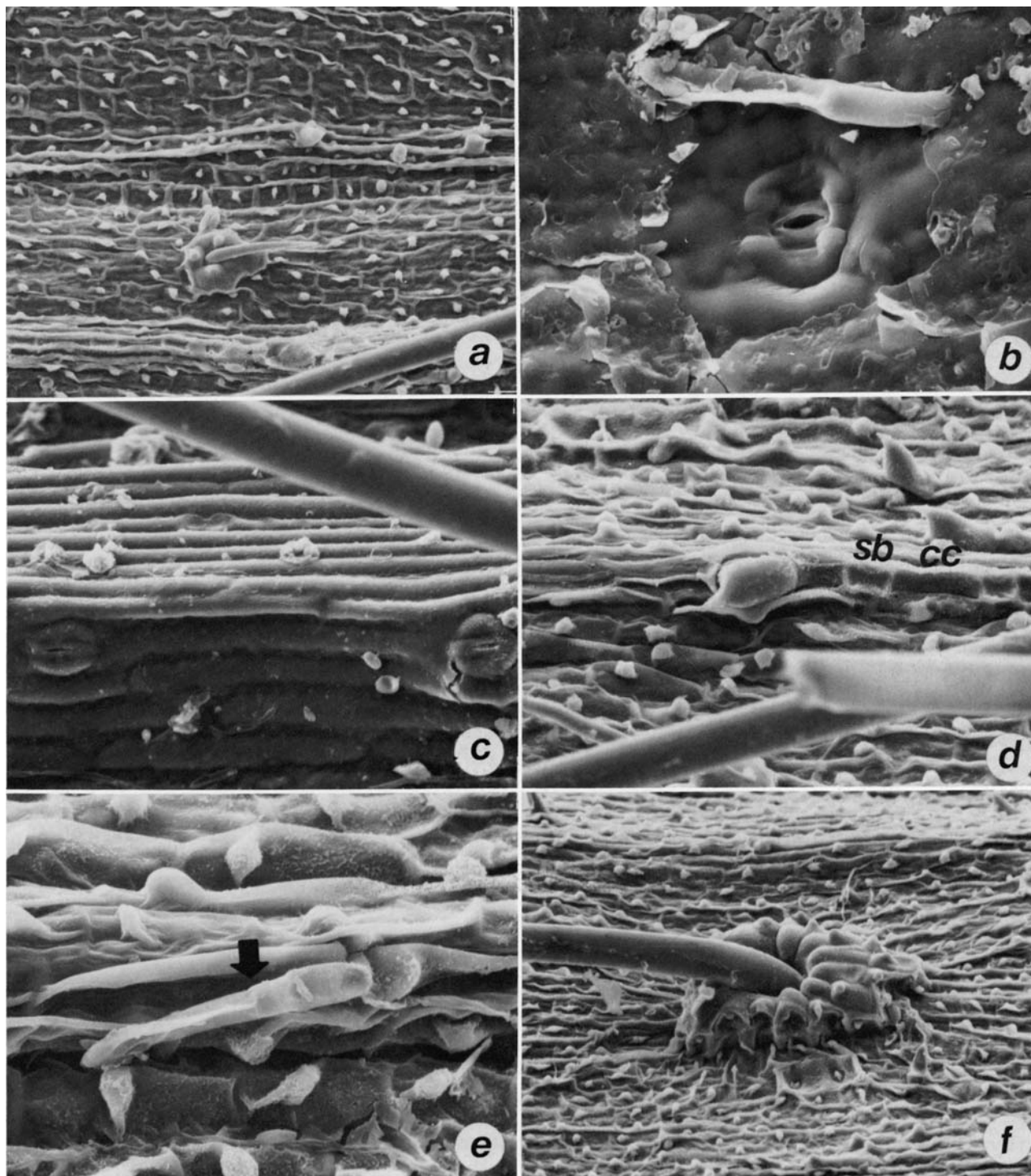


PLATE 40.—Adaxial epidermis *Cyrtococcum multinode*, Dawkins D571: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cell, long cells, $\times 640$; *d*, costal and intercostal prickles, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair (arrow), $\times 1250$; *f*, base of macrohair, $\times 320$.

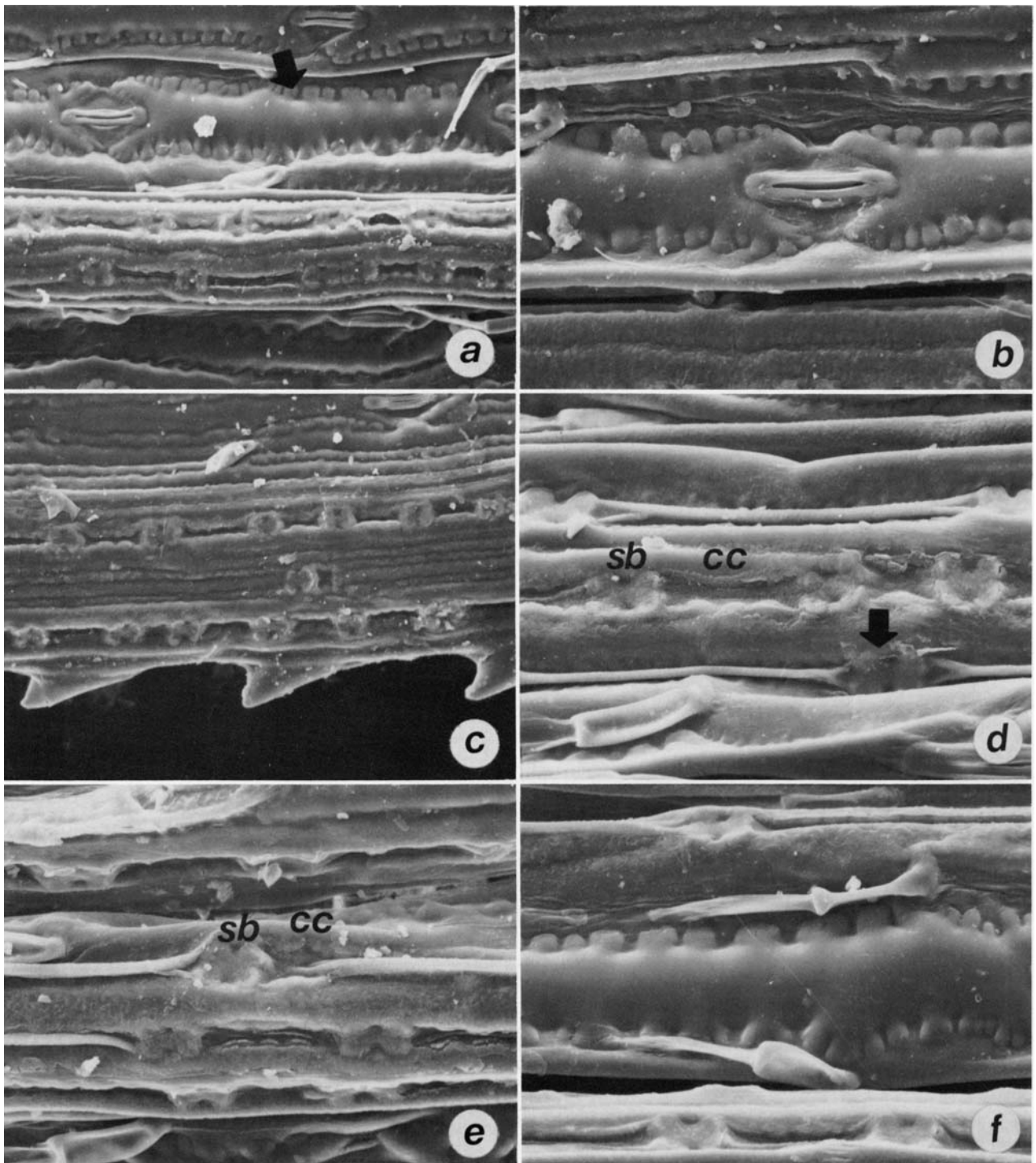


PLATE 41.—Abaxial epidermis *Digitaria diagonalis* var. *uniglumis*, Boaler 738: *a*, overview, interstomatal cell (arrow), $\times 320$; *b*, stoma, $\times 640$; *c*, marginal prickles, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 640$; *e*, intercostal silica body (sb), cork cell (cc), $\times 640$; *f*, microhairs, $\times 640$.

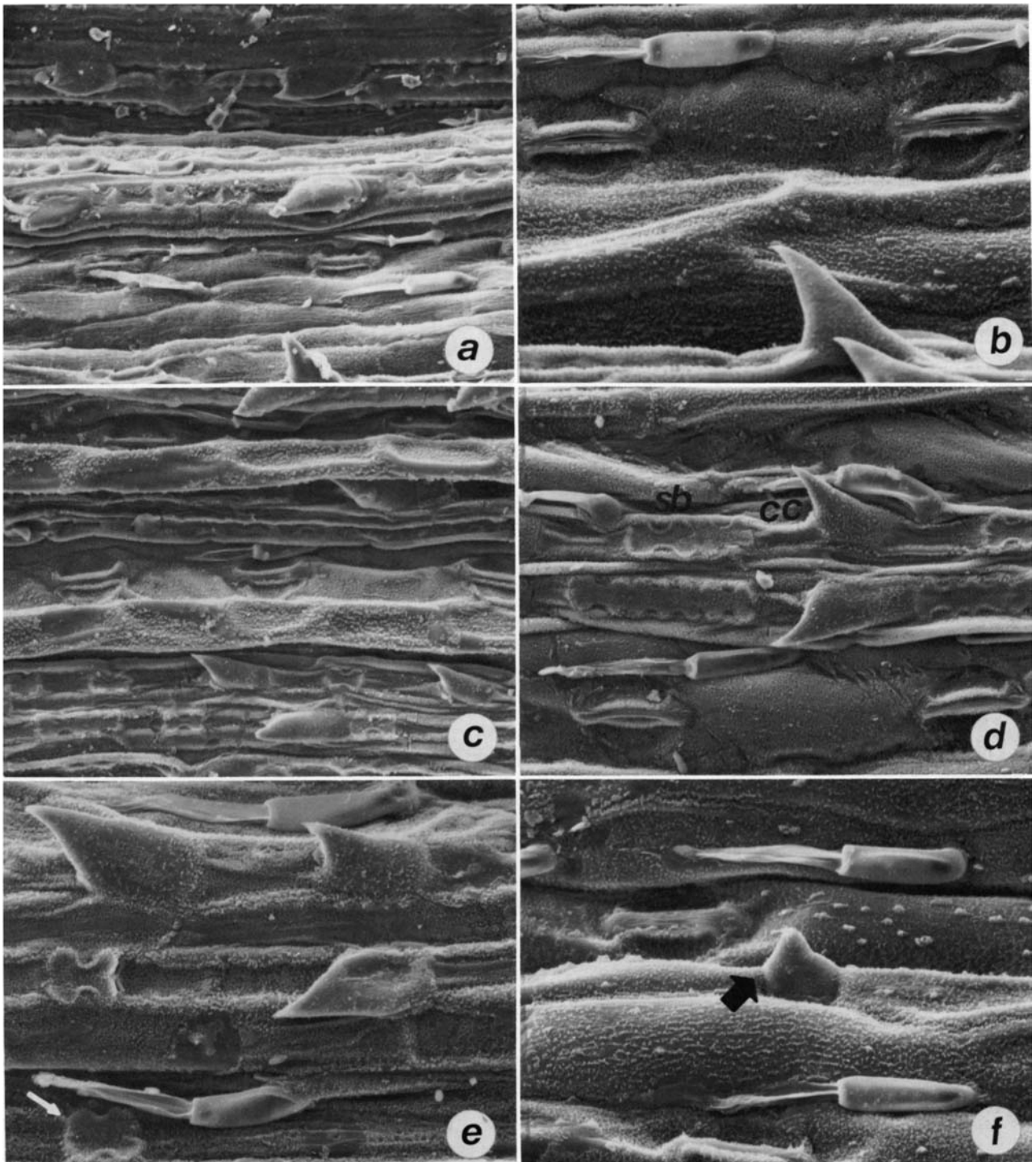


PLATE 42.—Adaxial epidermis *Digitaria diagonalis* var. *uniglumis*, Boaler 738: *a*, overview, $\times 320$; *b*, stomata, interstomatal cell, $\times 640$; *c*, interstomatal cells, long cells, $\times 320$; *d*, costal prickles, costal silica bodies (sb), cork cells (cc), $\times 480$; *e*, intercostal silica body (arrow), $\times 640$; *f*, intercostal hook (arrow), microhairs, $\times 640$.

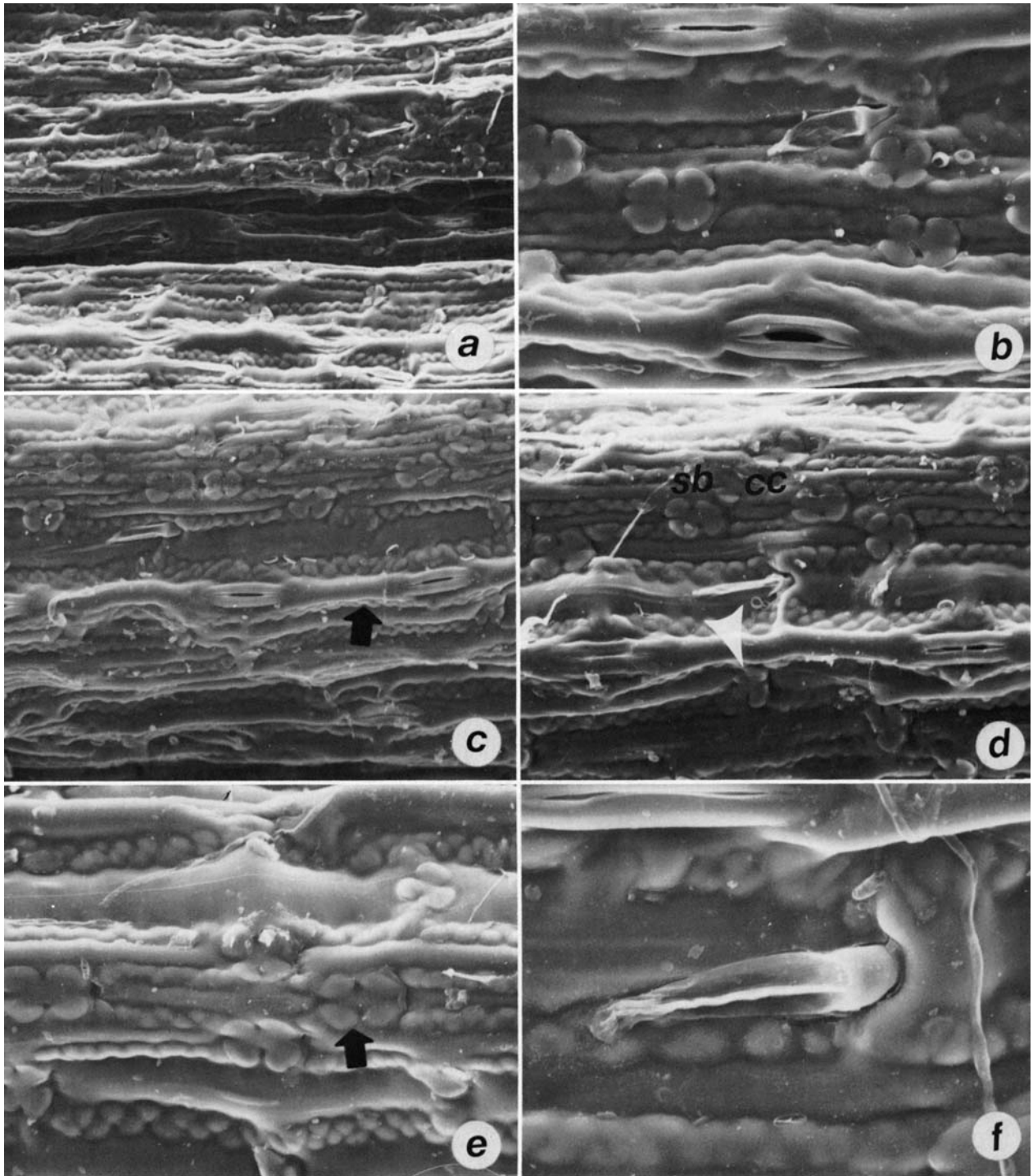


PLATE 43.—Abaxial epidermis *Eccoptocarpa obconiciventrif*, Boaler 246: *a*, overview, long cells, $\times 240$; *b*, stomata, $\times 640$; *c*, interstomatal cells (arrow), stomata, long cells, $\times 320$; *d*, intercostal silica bodies (arrow), costal silica bodies (sb), cork cell (cc), $\times 416$; *e*, costal silica bodies (arrow), $\times 640$; *f*, microhair, $\times 1250$.

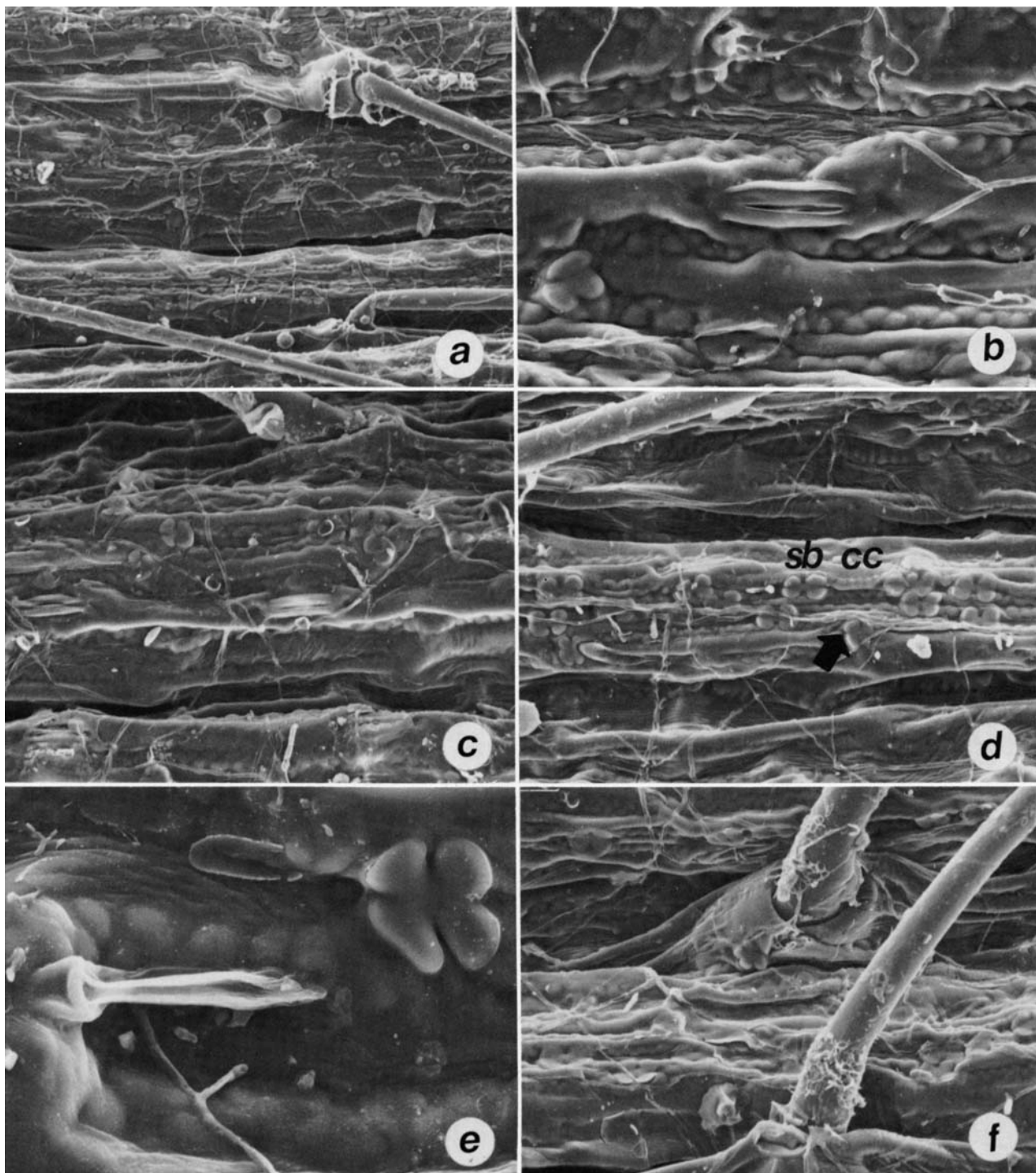


PLATE 44.—Adaxial epidermis *Eccoptocarpha obconiciventris*, Boaler 246: *a*, overview, $\times 160$; *b*, stoma, $\times 640$; *c*, interstomatal cells, long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica bodies (arrow), $\times 320$; *e*, microhair, $\times 1250$; *f*, base of macrohair, $\times 320$.

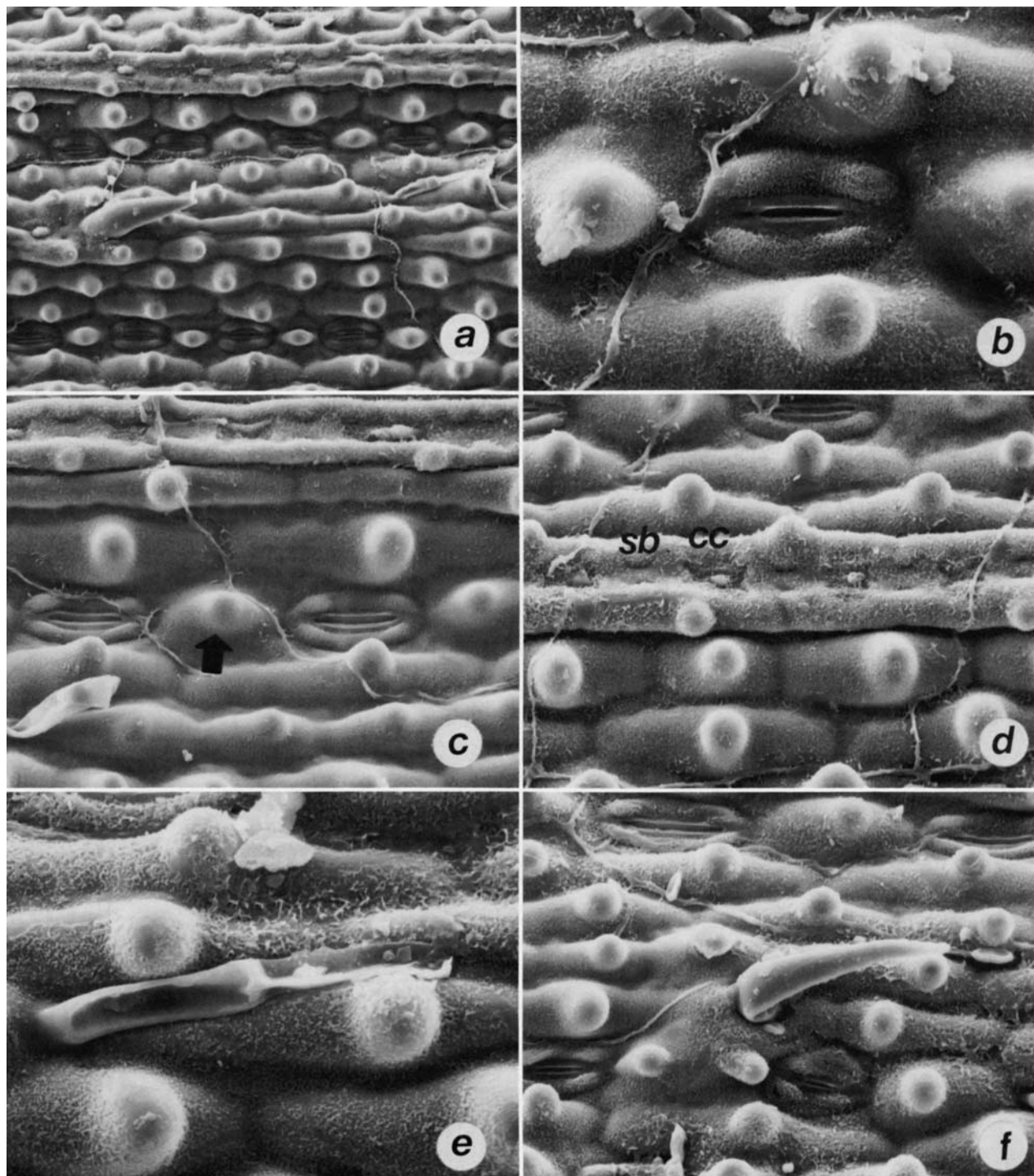


PLATE 45.—Abaxial epidermis *Echinochloa haploclada*, Johnston s. n., 1 November 1933: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cell (arrow), long cells, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, microhair, $\times 1250$; *f*, intercostal short macrohair, $\times 640$.

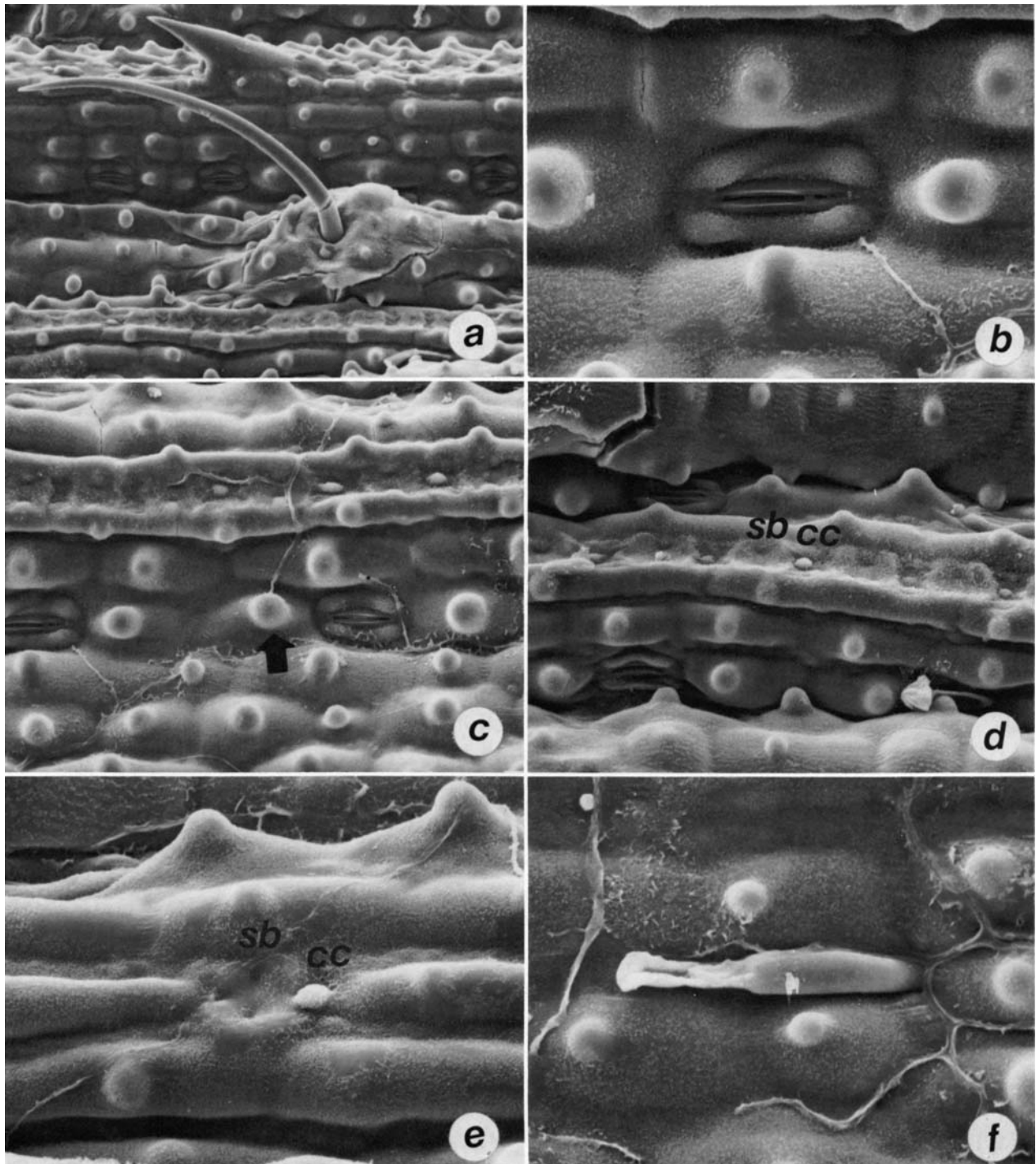


PLATE 46.—Adaxial epidermis *Echinochloa haplocada*, Johnston *s. n.*, 1 November 1933: *a*, overview, macrohairs, intercostal prickle, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cells (arrow) long cells, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, intercostal silica body (sb) cork cell (cc), $\times 1250$; *f*, microhair, $\times 1250$.

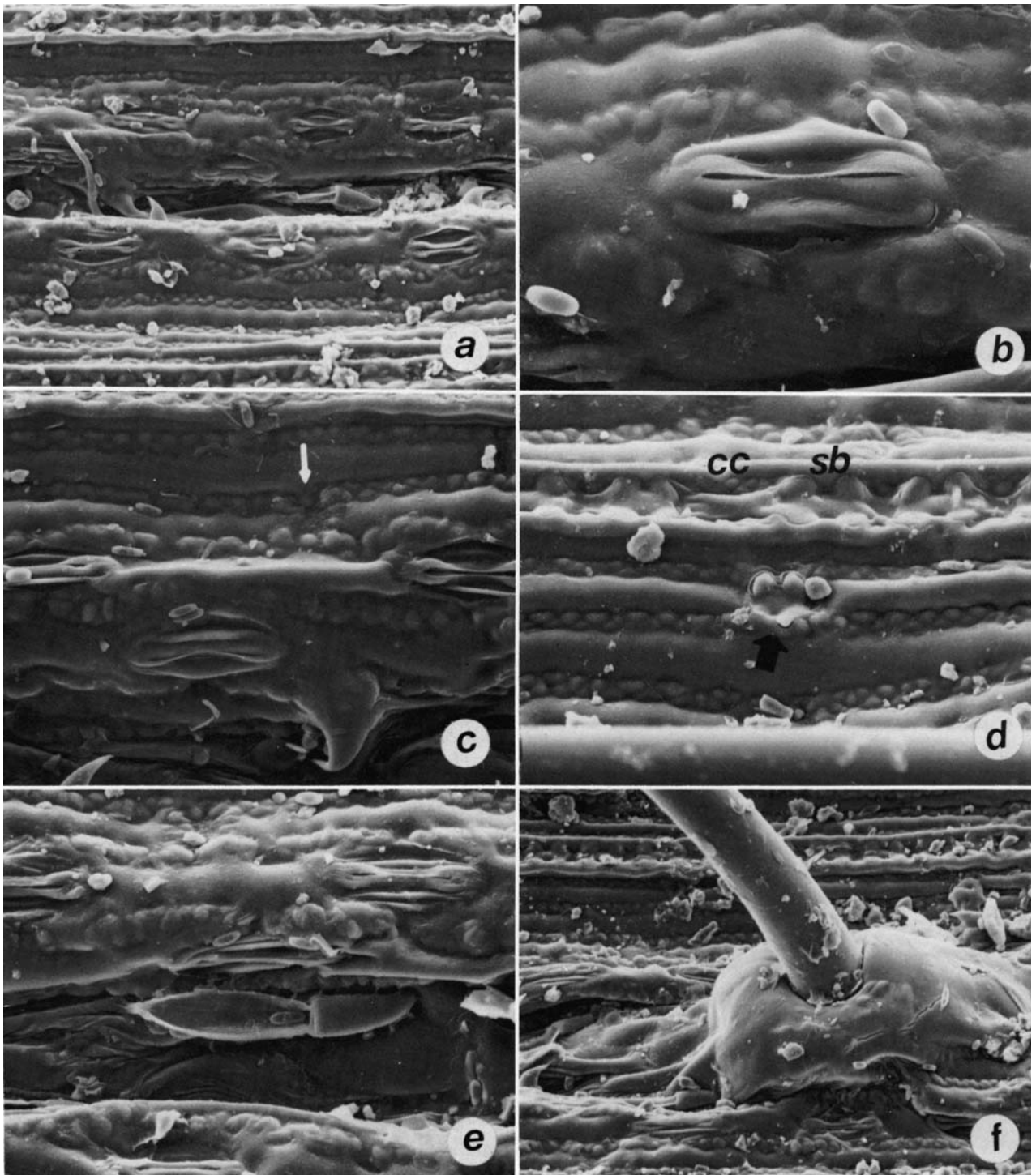


PLATE 47.—Abaxial epidermis *Entolasia imbricata*, Bogdan 4054: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cell, long cells, intercostal cork cell (arrow), prickles, $\times 640$; *d*, intercostal silica body (arrow), costal silica body (sb), cork cell (cc), $\times 640$; *e*, microhair, $\times 640$; *f*, base of macrohair, $\times 320$.

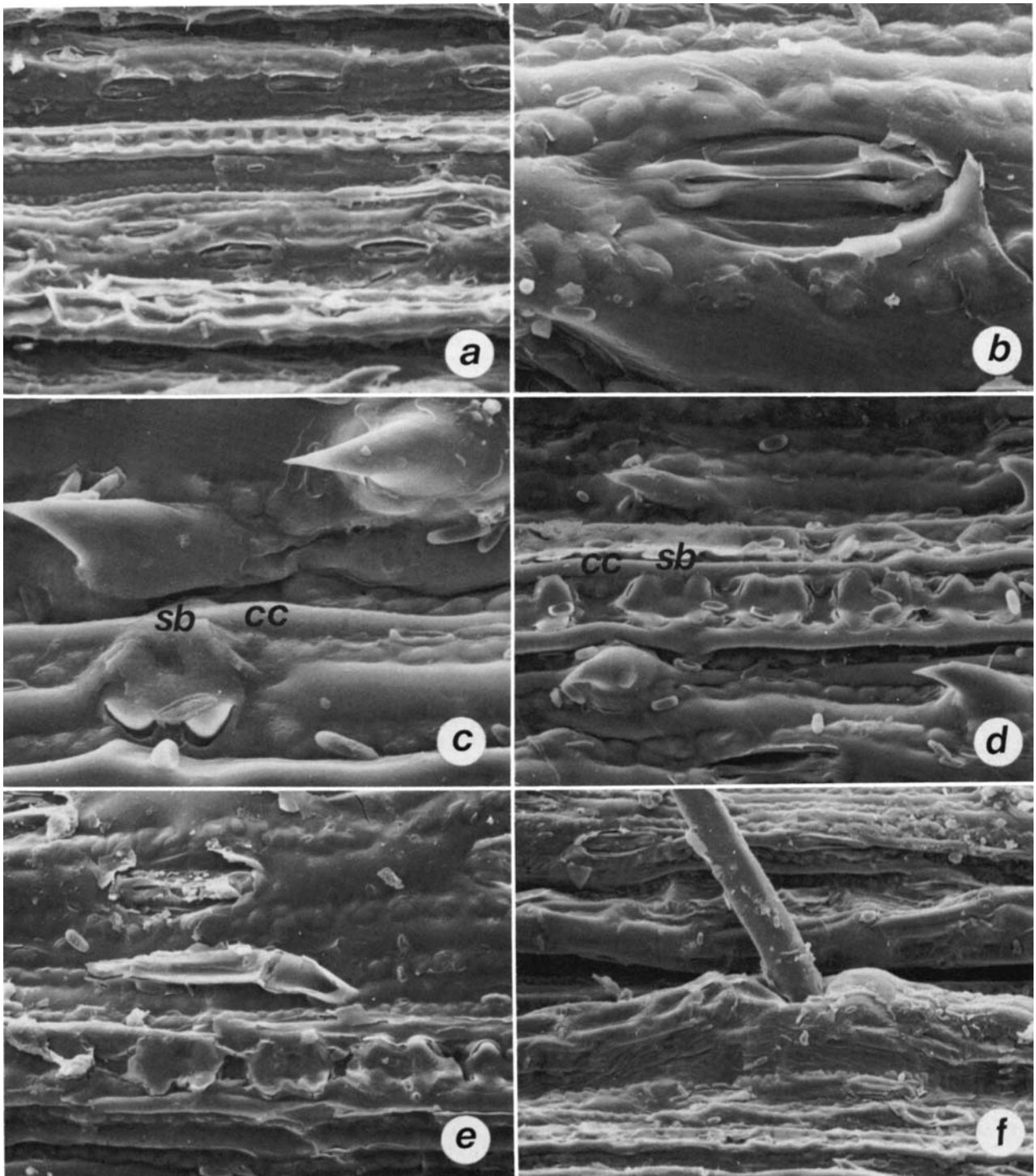


PLATE 48.—Adaxial epidermis *Entolasia imbricata*, Bogdan 4054: *a*, overview, interstomatal cells, $\times 320$; *b*, stoma, $\times 1250$; *c*, intercostal silica body (sb), cork cell (cc), prickles, $\times 1250$; *d*, costal silica bodies (sb), cork cells (cc), long cells, $\times 640$; *e*, microhair, $\times 640$; *f*, base of macrohair, $\times 320$.

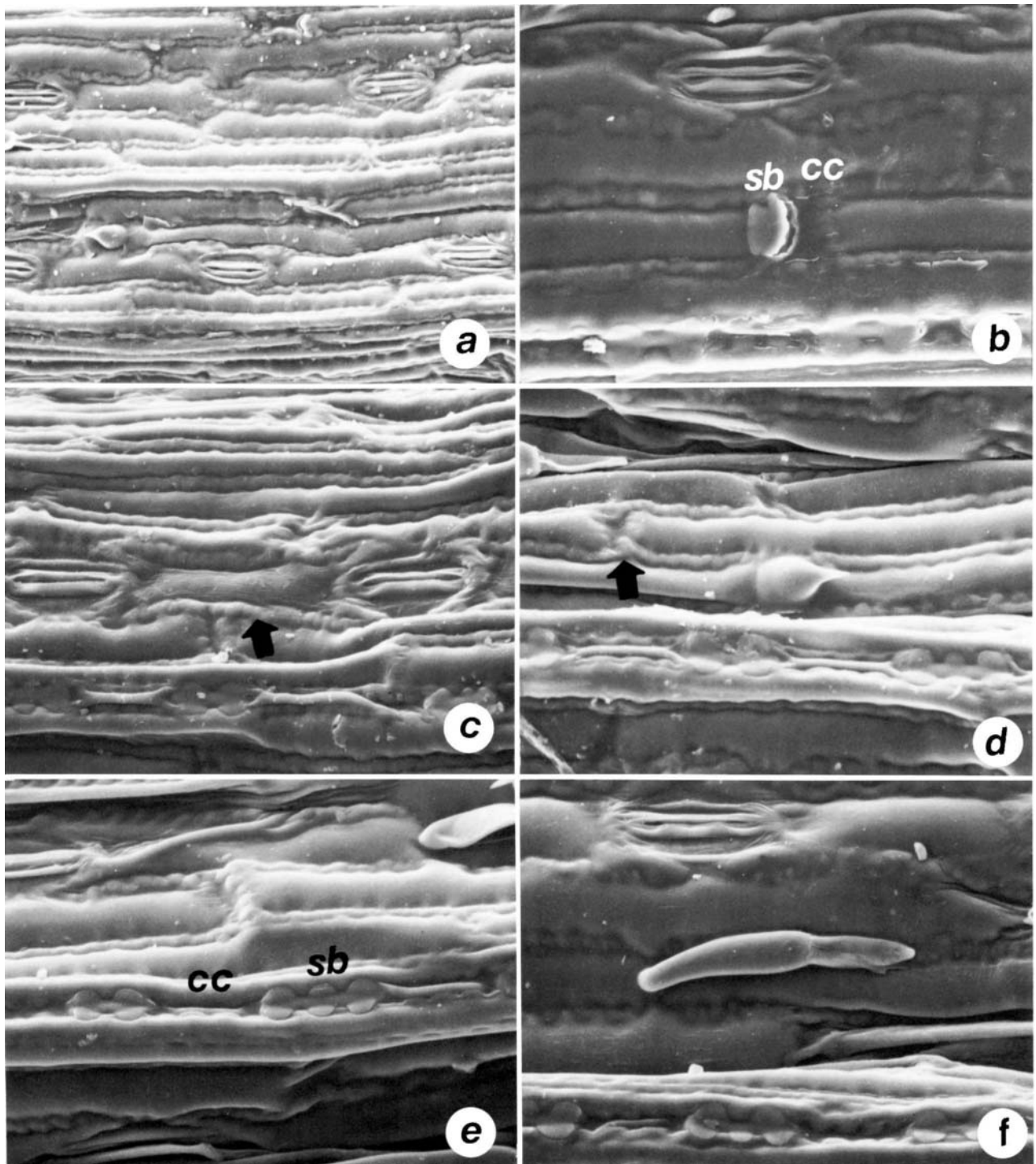


PLATE 49.—Abaxial epidermis *Eriochloa meyerana*, Glover, Gwynne, Samuel 454: *a*, overview, $\times 320$; *b*, stoma, intercostal silica body (sb), cork cell (cc), $\times 640$; *c*, interstomatal cell (arrow), $\times 640$; *d*, long cells, hooks, intercostal cork cells (arrow), $\times 640$; *e*, costal silica bodies (sb), cork cells (cc), $\times 640$; *f*, microhair, $\times 640$.

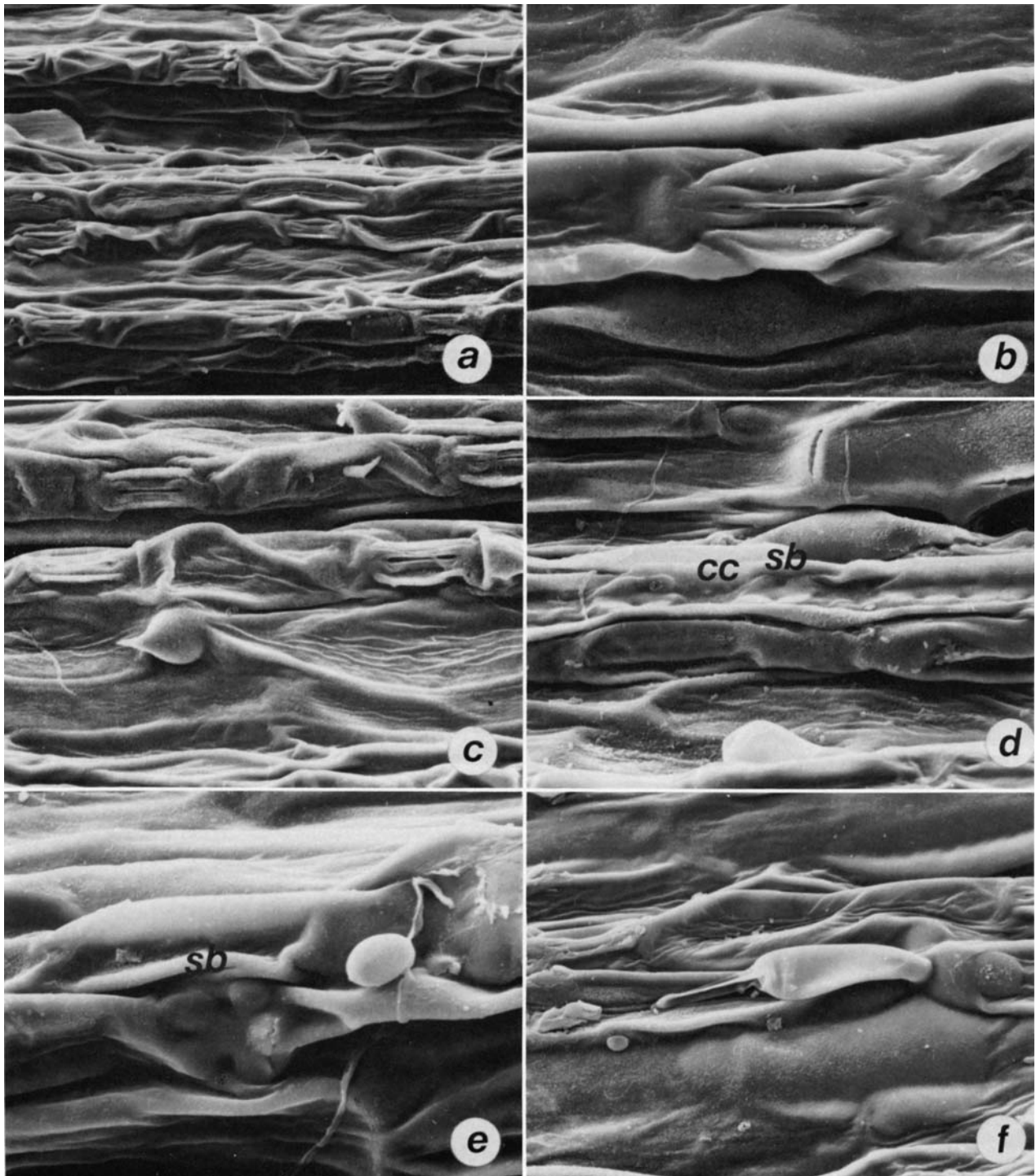


PLATE 50.—Adaxial epidermis *Eriochloa meyerana*, Glover, Gwynne, Samuel 454: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cells, $\times 640$; *d*, long cells, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, intercostal silica body (sb), $\times 1250$; *f*, microhair, $\times 640$.

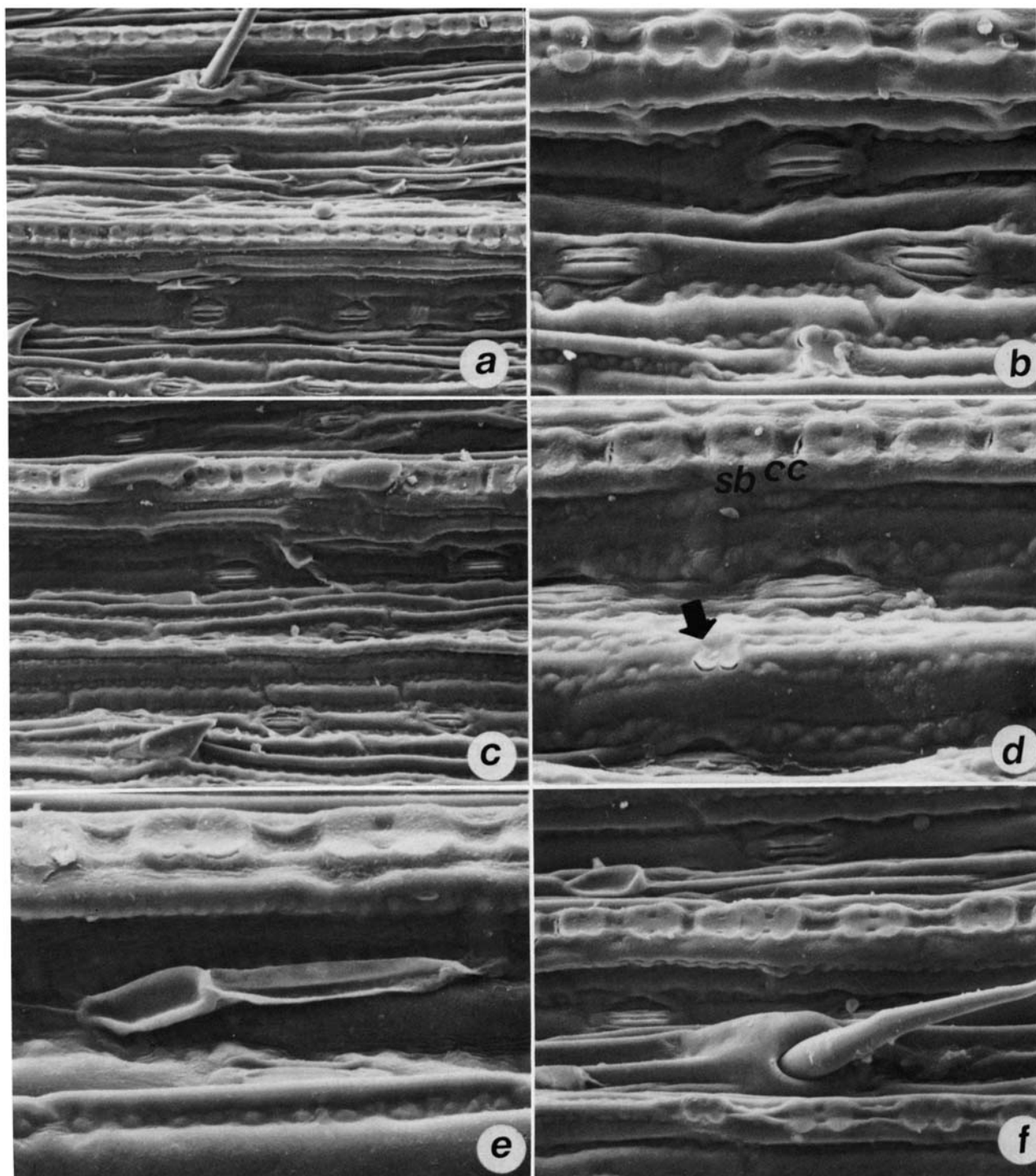


PLATE 51.—Abaxial epidermis *Holcolemma inaequale*, Polhill and Paulo 619: *a*, overview, $\times 240$; *b*, stomata, interstomatal cell, $\times 640$; *c*, long cells, prickles, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 640$; *e*, microhair, $\times 960$; *f*, intercostal macrohair, $\times 480$.

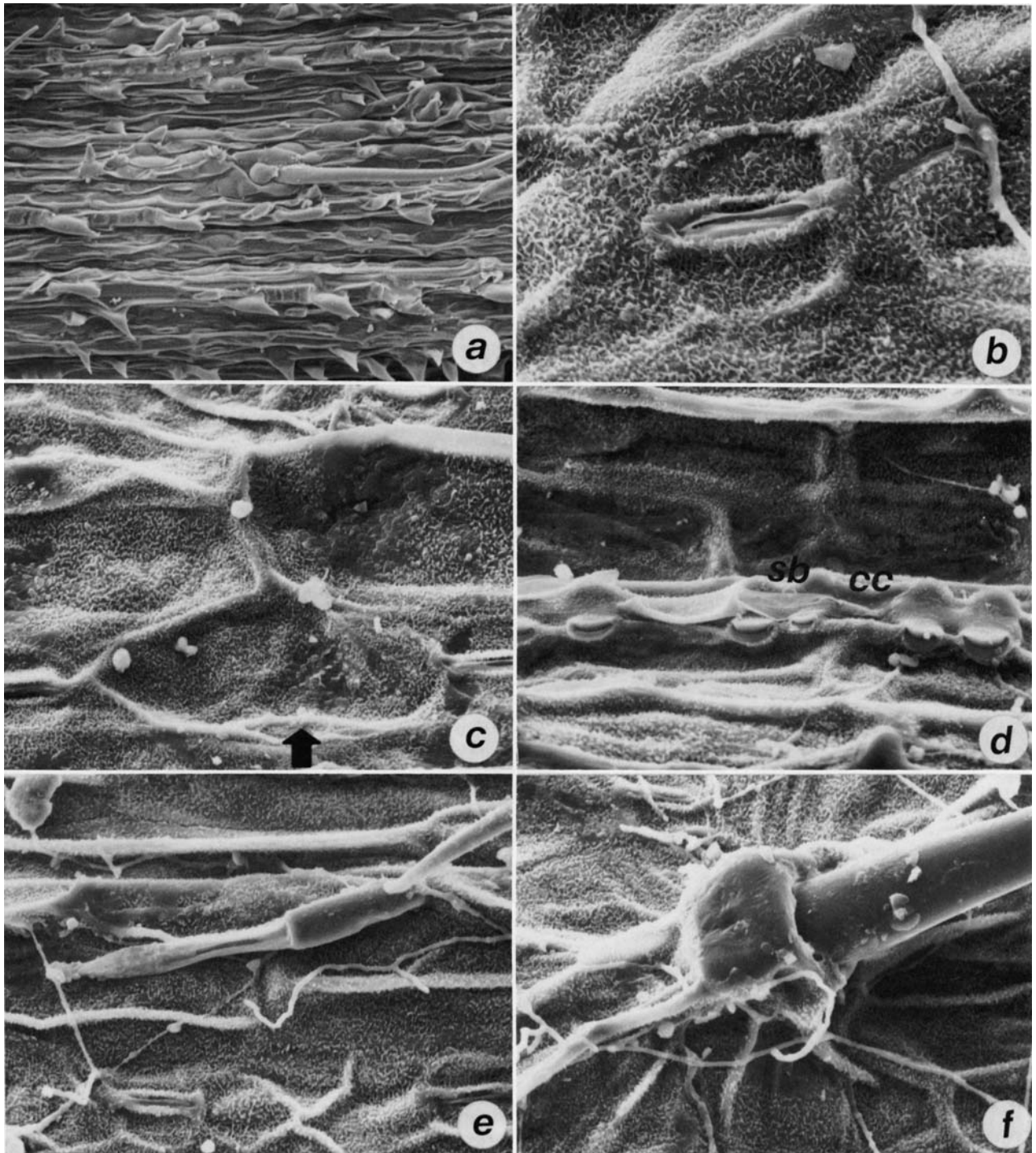


PLATE 52.—Adaxial epidermis *Holcolemma inaequale*, Polhill and Paulo 619 (a), Nicholson 113 (b–f): a, overview, prickles, $\times 160$; b, stoma, $\times 1625$; c, interstomatal cell (arrow), $\times 832$; d, costal silica bodies (sb), cork cells (cc), $\times 832$; e, microhair, $\times 832$; f, base of macrohair, $\times 832$.

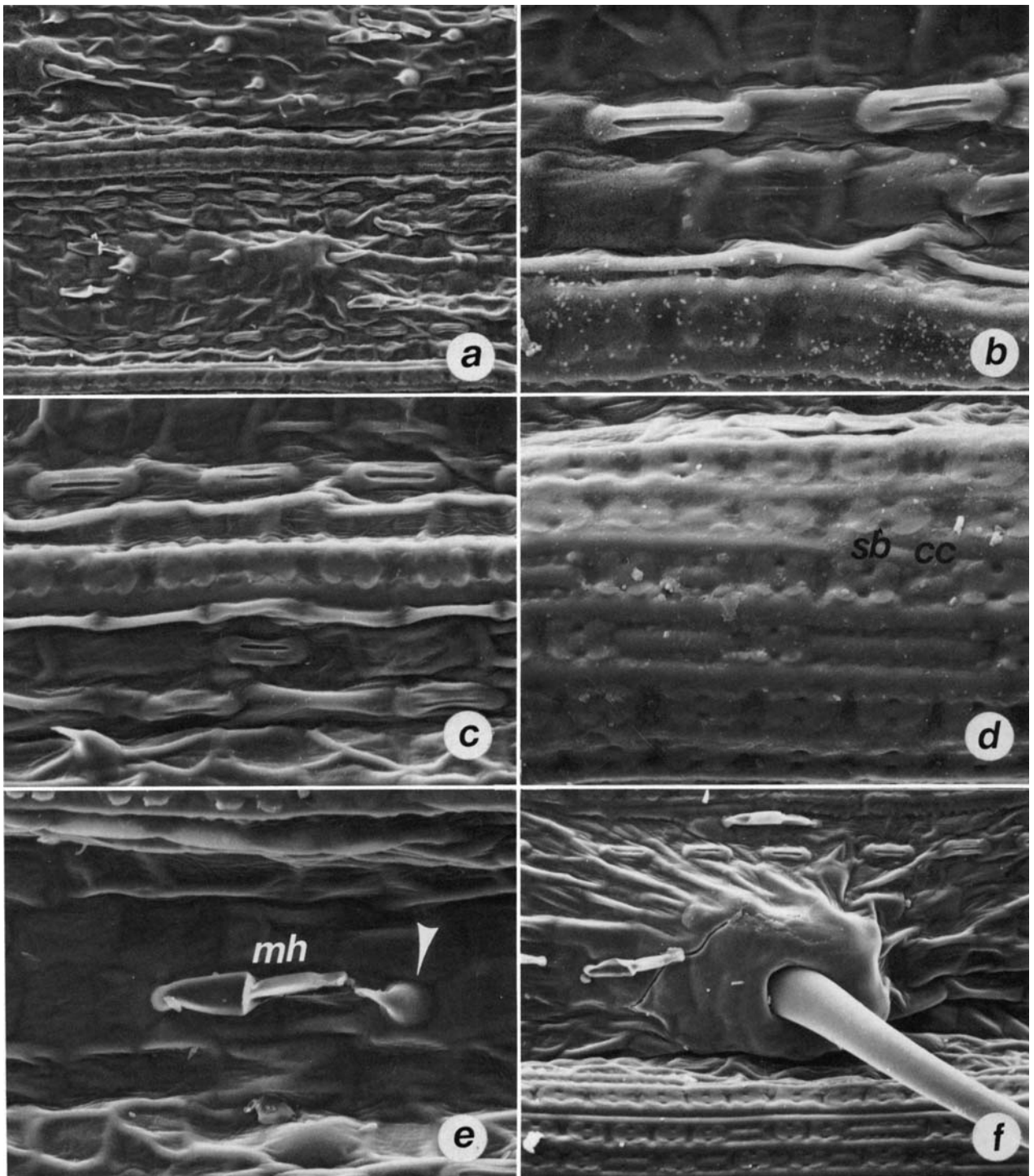


PLATE 53.—Abaxial epidermis *Hylebates chlorochloe*, A. Bogdan AB3909: *a*, overview, long cells, $\times 240$; *b*, stomata, $\times 960$; *c*, interstomatal cells, long cells, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, intercostal hook (arrow), microhair (mh), $\times 640$; *f*, base of macrohair, $\times 320$.

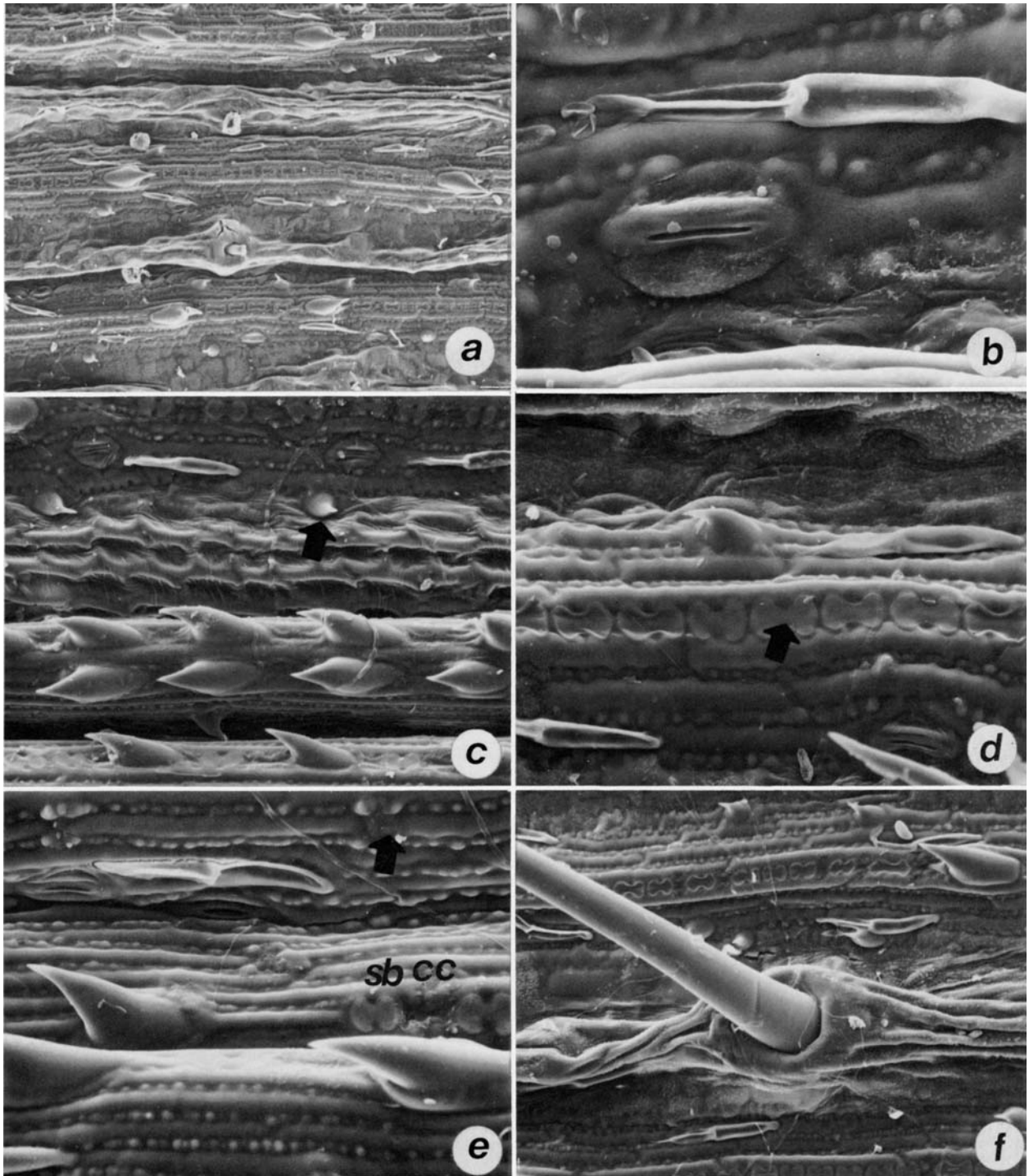


PLATE 54.—Adaxial epidermis *Hylebates chlorochloe*, A. Bogdan AB3909: *a*, overview, long cells, $\times 160$; *b*, stoma, microhair, $\times 1250$; *c*, interstomatal cells, costal prickles, intercostal hooks (arrow), $\times 320$; *d*, costal silica bodies (arrow), $\times 640$; *e*, costal cork cells (cc), silica bodies (sb), intercostal cork cells (arrow), $\times 640$; *f*, base of macrohair, $\times 320$.

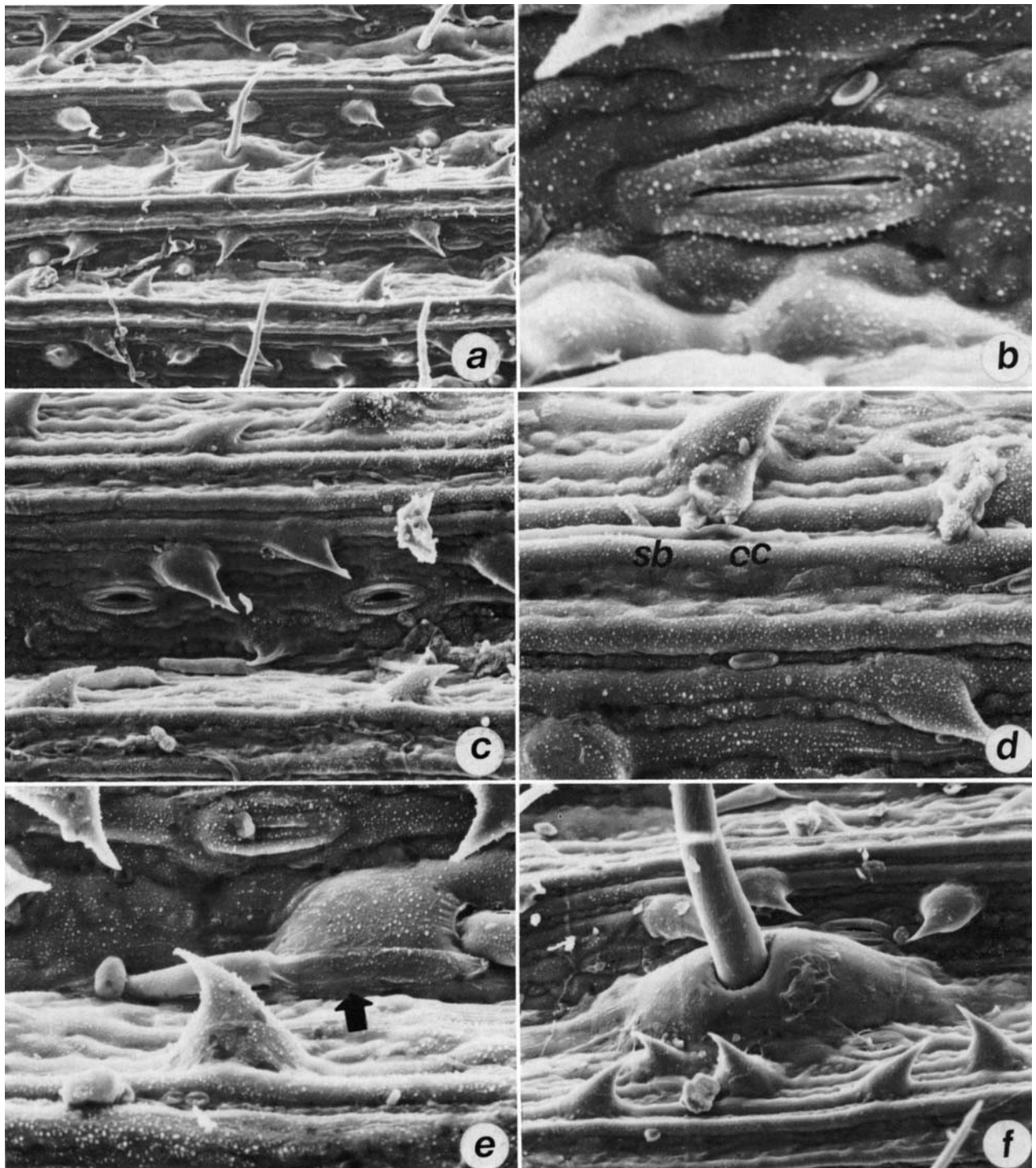


PLATE 55.—Abaxial epidermis *Melinis ambigua*, Greenway 14489: *a*, overview, macrohairs, $\times 208$; *b*, stoma, $\times 1625$; *c*, interstomatal cell, prickles, $\times 416$; *d*, costal silica bodies (sb), cork cells (cc), $\times 832$; *e*, microhair (arrow), $\times 832$; *f*, base of macrohair, $\times 416$.

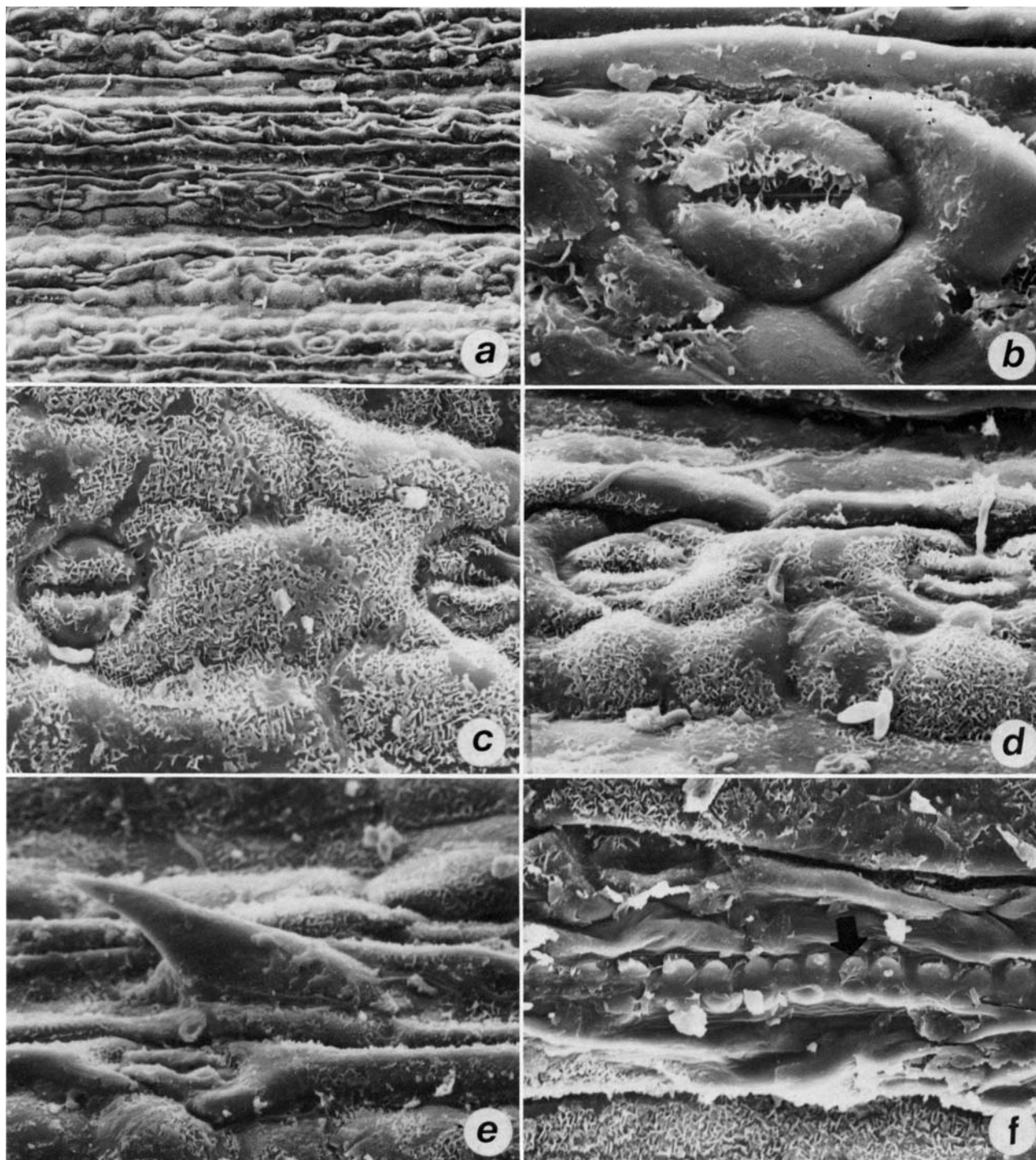


PLATE 56.—Adaxial epidermis *Melinis ambigua*, Greenway 14489: *a*, overview, $\times 208$; *b*, stoma, $\times 1625$; *c*, interstomatal cell, $\times 832$; *d*, long cells, $\times 832$; *e*, prickle, $\times 832$; *f*, costal silica bodies (arrow), $\times 832$.

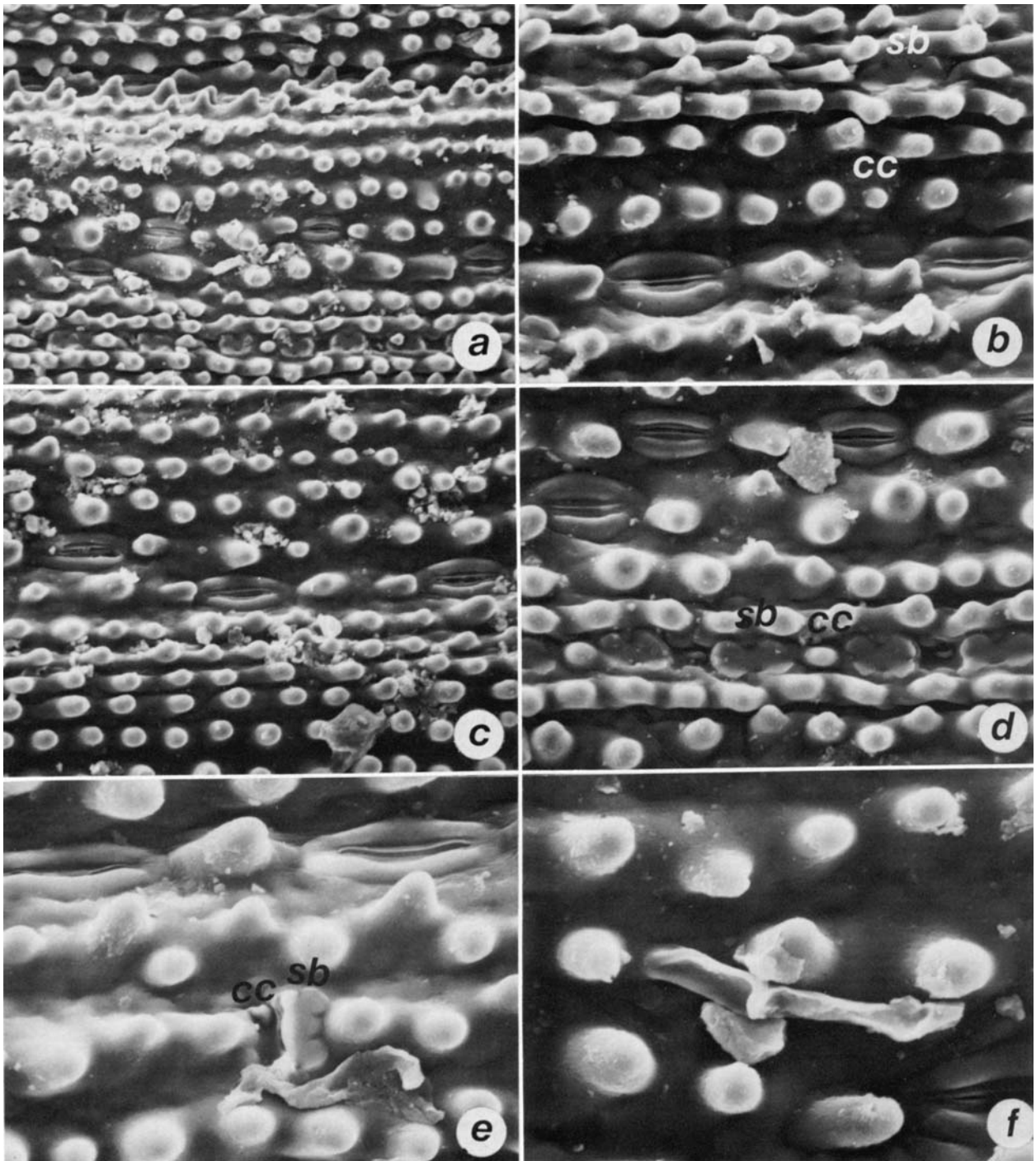


PLATE 57.—Abaxial epidermis *Odontelytrum abyssinicum*, Ash 2103: *a*, overview, $\times 320$; *b*, stomata, intercostal cork cell (cc), silica body (sb), $\times 640$; *c*, interstomatal cells, long cells, $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, intercostal silica body (sb), cork cell (cc), $\times 960$; *f*, microhair, $\times 1250$.

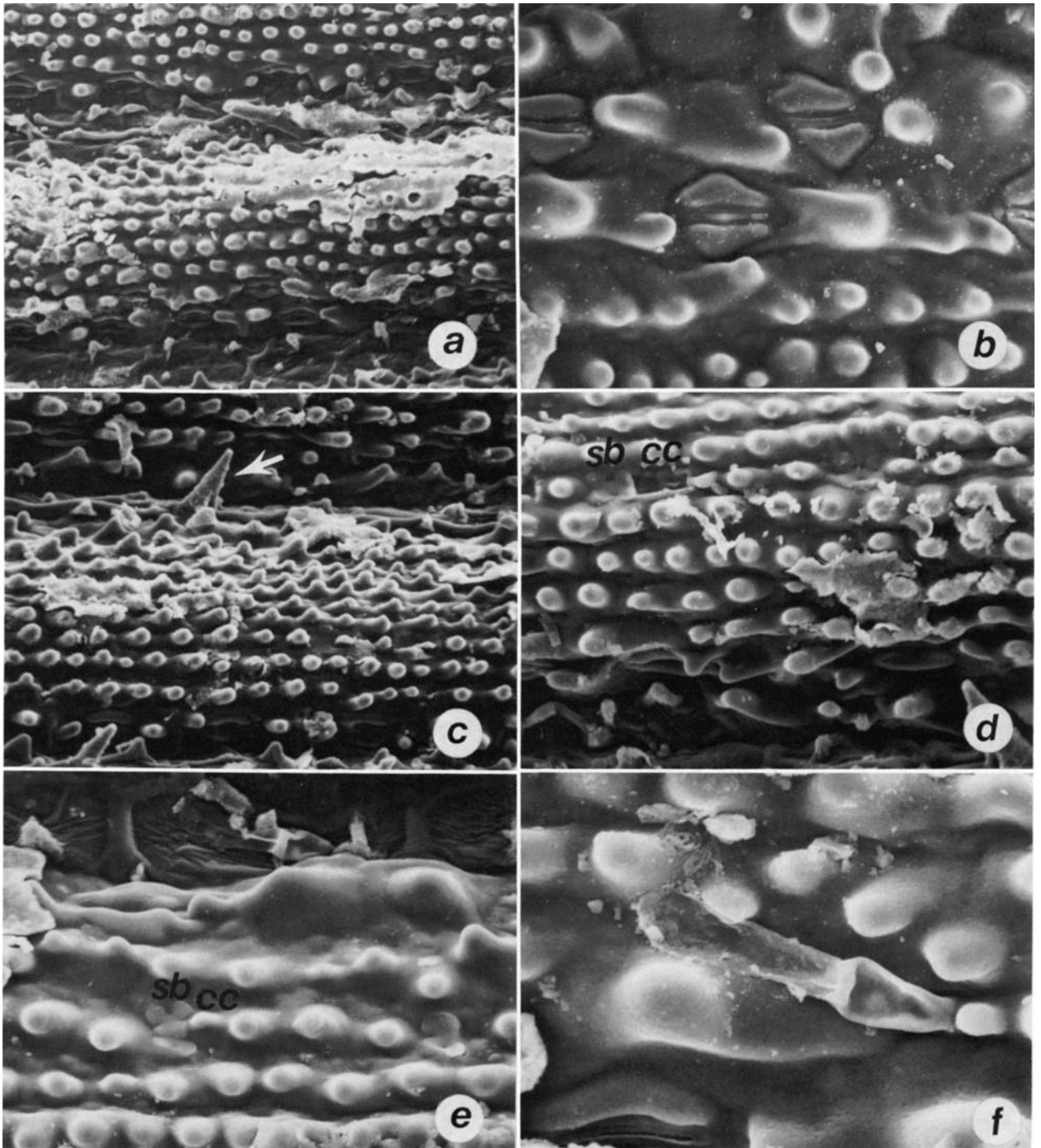


PLATE 58.—Adaxial epidermis *Odontelytrum abyssinicum*, Ash 2103: *a*, overview, $\times 240$; *b*, stomata, interstomatal cells, $\times 960$; *c*, long cells, intercostal prickles (arrow), $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 480$; *e*, intercostal silica body (sb), cork cells (cc), $\times 640$; *f*, microhair, $\times 1250$.

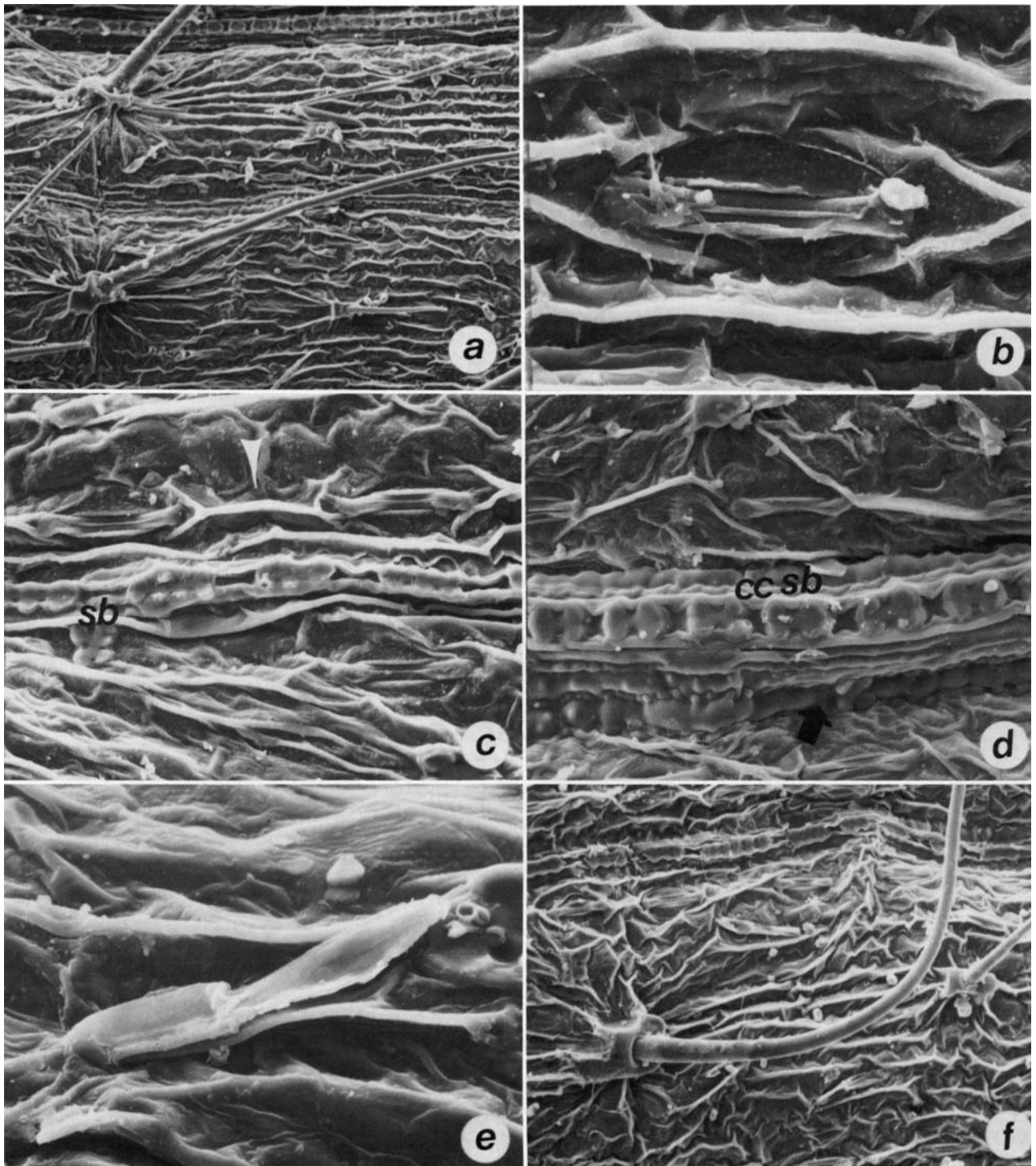


PLATE 59.—Abaxial epidermis *Oplismenus burmannii*, Nicholson 213: *a*, overview, macrohairs, $\times 160$; *b*, stoma, $\times 1250$; *c*, interstomatal cell (arrow), long cells, intercostal silica body (sb), $\times 544$; *d*, costal silica bodies (sb), cork cells (cc), intercostal cork cell (arrow), silica body, $\times 512$; *e*, microhair, $\times 1250$; *f*, macrohairs, $\times 272$.

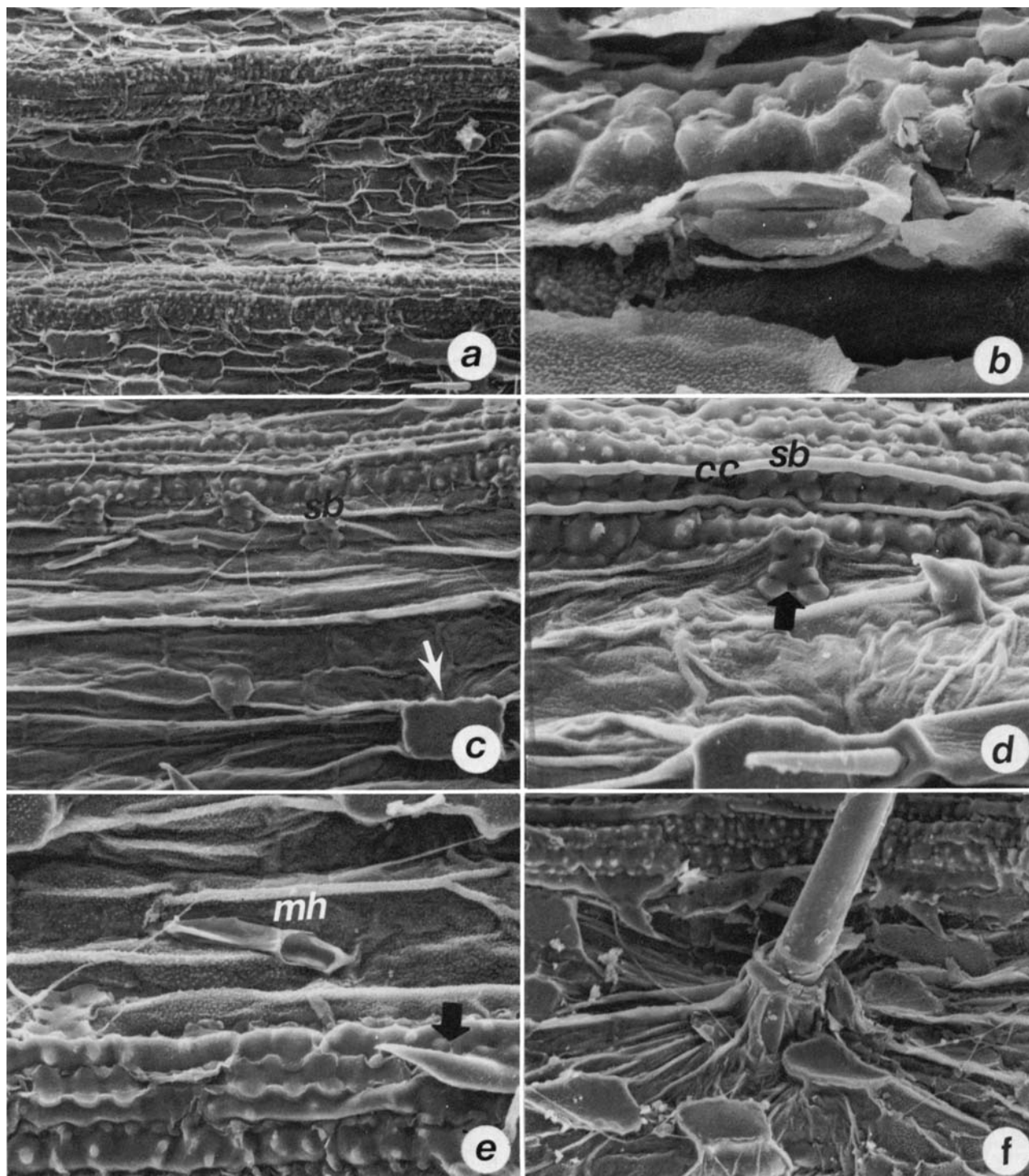


PLATE 60.—Adaxial epidermis *Oplismenus burmannii*, Nicholson 213: *a*, overview, $\times 160$; *b*, stoma, $\times 1250$; *c*, long cells, intercostal silica bodies (sb), raised rectangular cell (arrow), $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 640$; *e*, microhair (mh), prickles (arrow), $\times 640$; *f*, base of macrohair, $\times 320$.

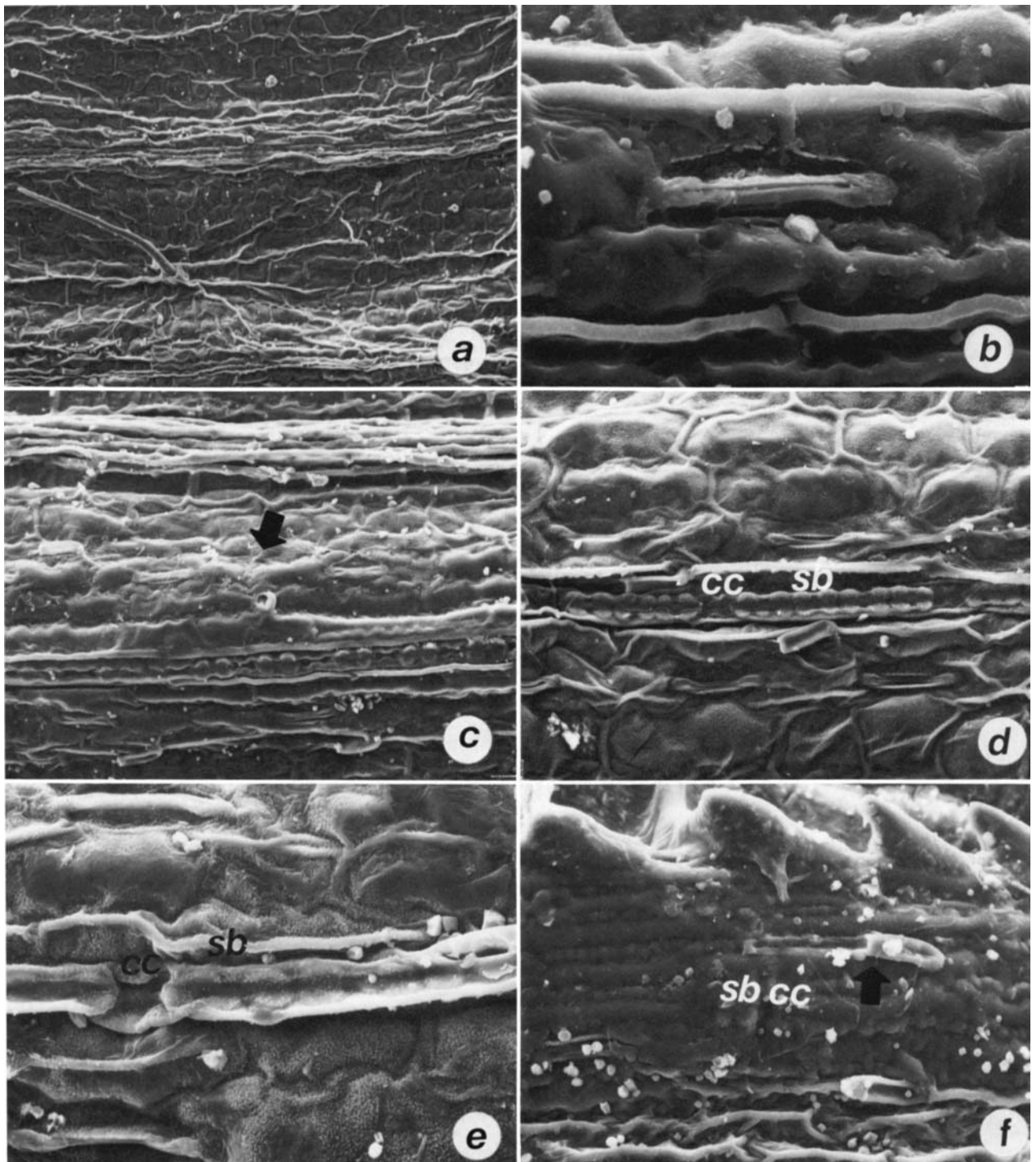


PLATE 61.—Abaxial epidermis *Panicum trichoides*, Gillman 1462: *a*, overview, macrohair, $\times 160$; *b*, stoma, $\times 1250$; *c*, interstomatal cells (arrow), long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 480$; *e*, costal silica bodies (sb), cork cells (cc), $\times 960$; *f*, microhairs (arrow), intercostal silica body (sb), cork cell (cc), $\times 640$.

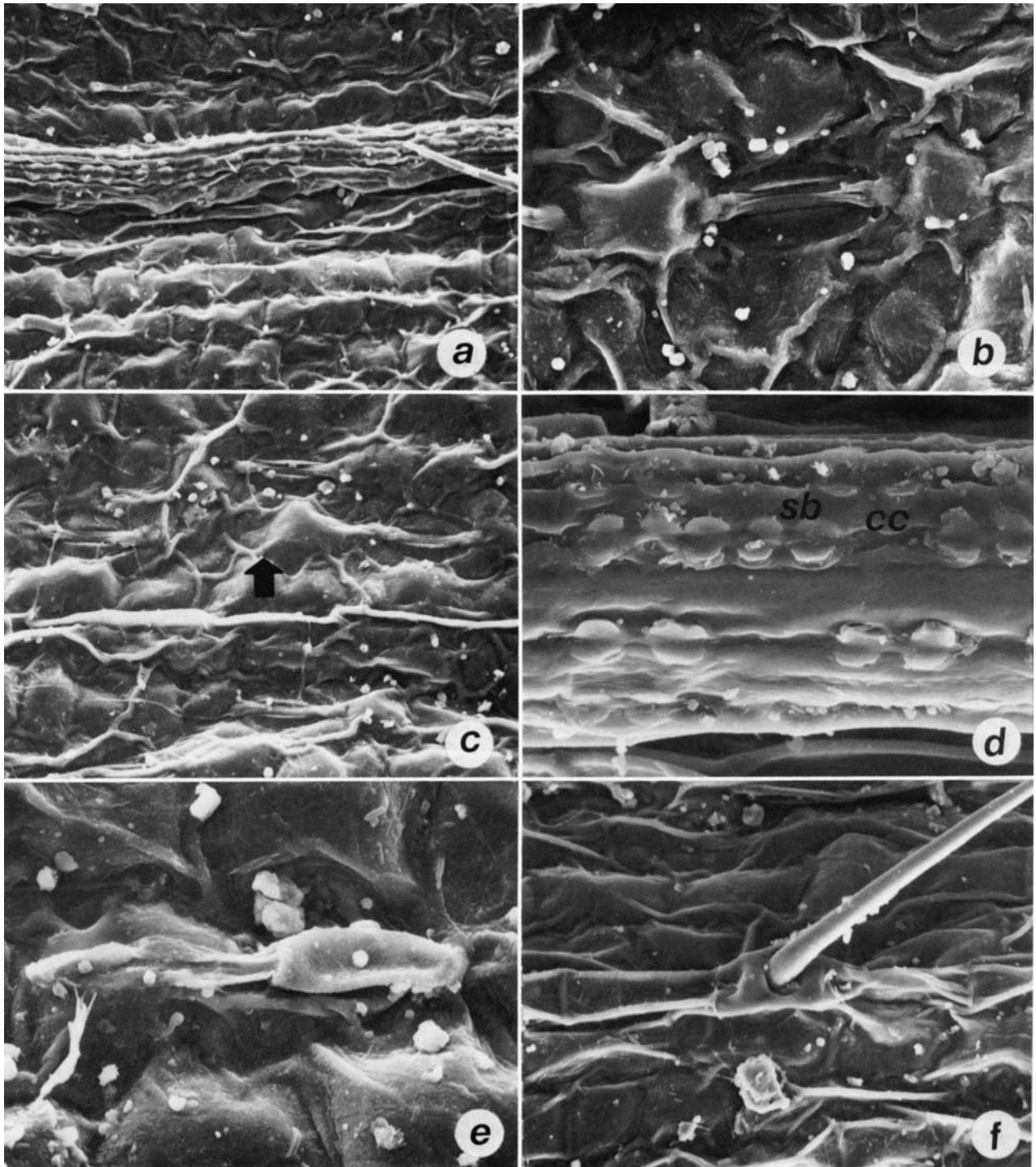


PLATE 62.—Adaxial epidermis *Panicum trichoides*, Gillman 1462: *a*, overview, long cells, $\times 320$; *b*, stoma, $\times 960$; *c*, interstomatal cells (arrow), $\times 480$; *d*, costal silica bodies (sb), cork cells (cc), $\times 960$; *e*, microhair, $\times 1250$; *f*, macrohair, $\times 320$.

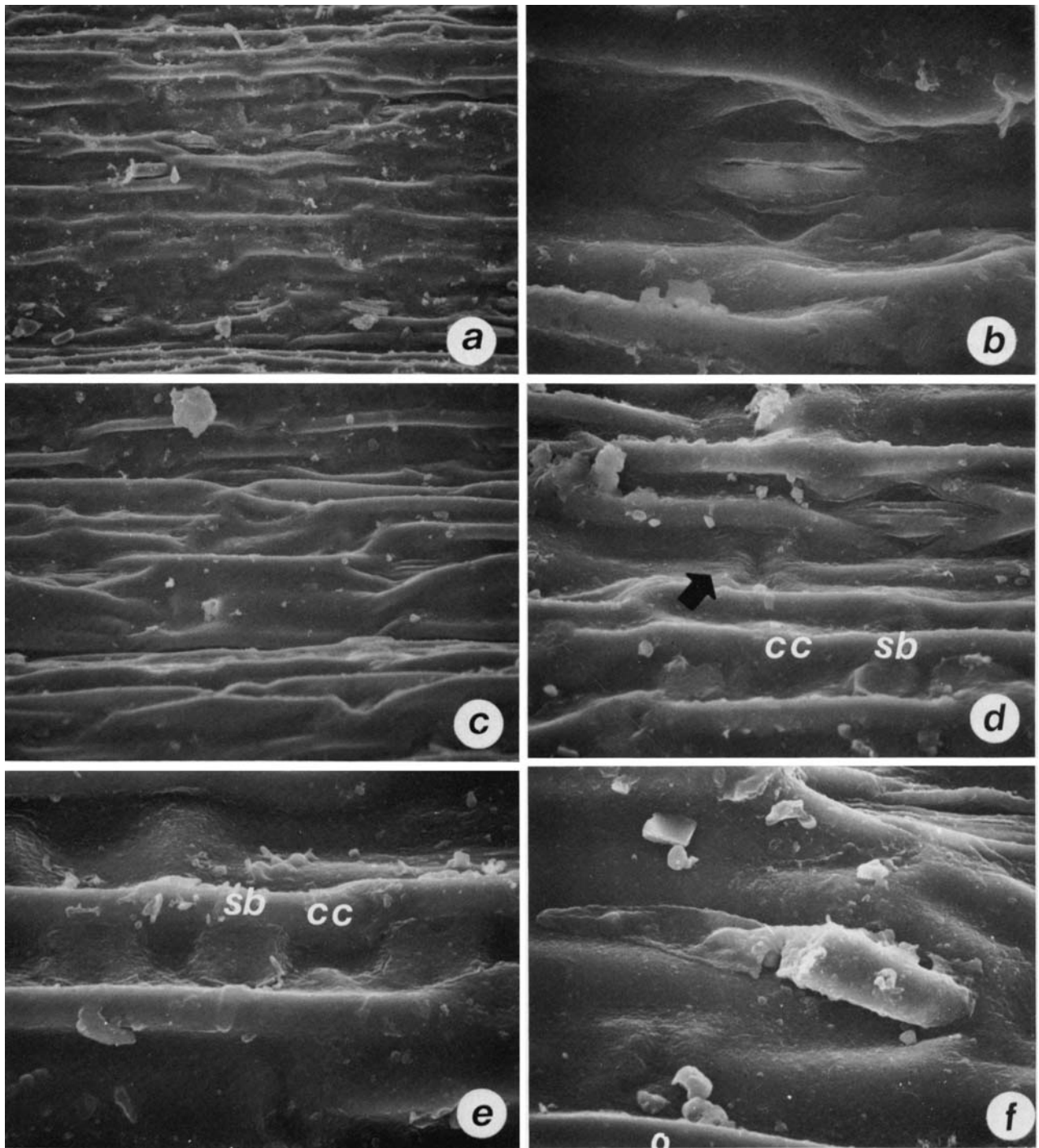


PLATE 63.—Abaxial epidermis *Paspalidium geminatum*, Ash 1376: *a*, overview, $\times 295$; *b*, stoma, $\times 1285$; *c*, interstomatal cell, long cells $\times 416$; *d*, intercostal cork cell (arrow), costal silica bodies (sb), cork cells (cc), $\times 867$; *e*, costal silica bodies (sb), cork cells (cc), $\times 1285$; *f*, microhair, $\times 1285$.

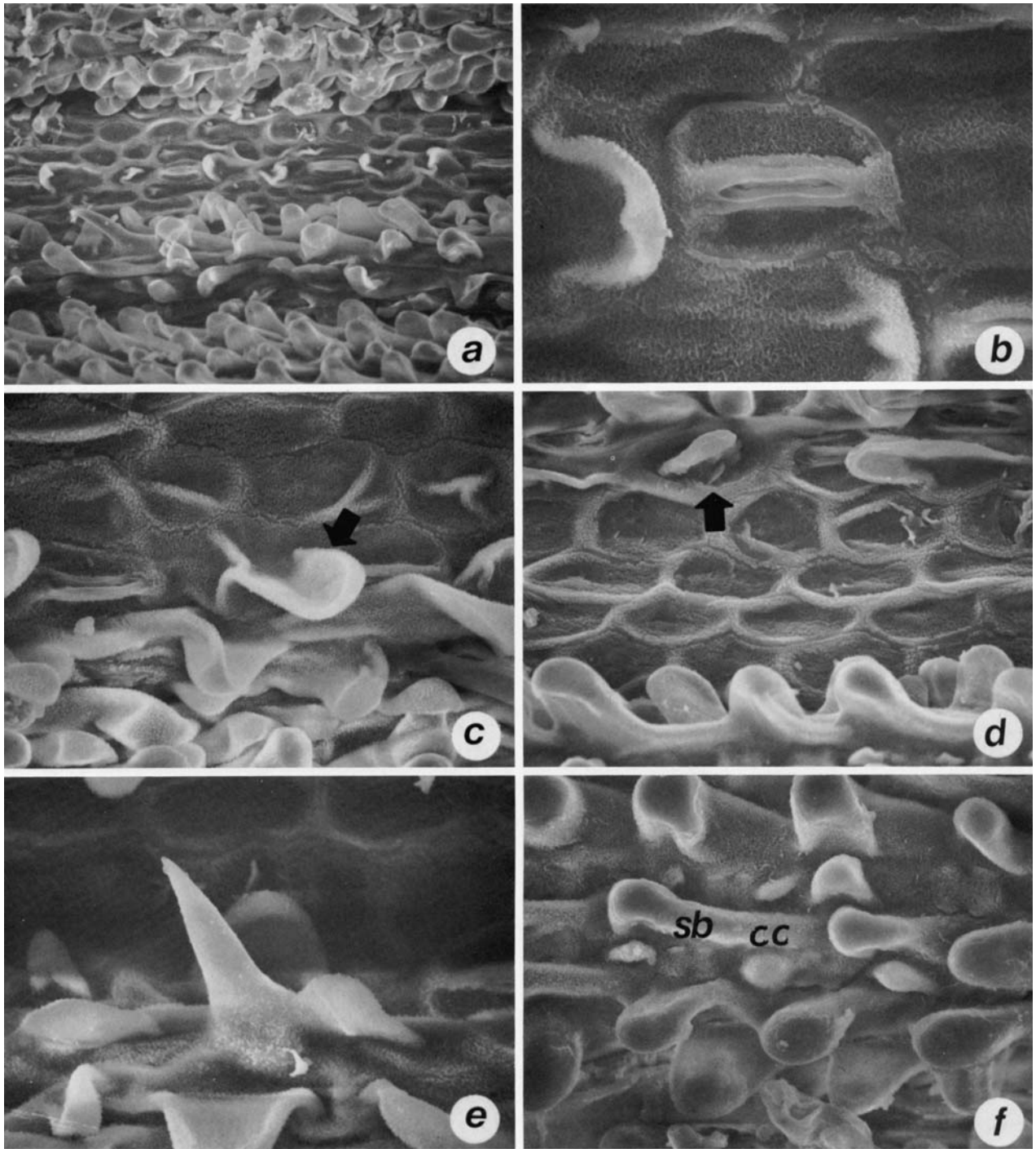


PLATE 64.—Adaxial epidermis *Paspalidium geminatum*, Ash 1376: *a*, overview, $\times 295$; *b*, stoma, $\times 1696$; *c*, interstomatal cell (arrow), $\times 867$; *d*, long cells, interstomatal cell (arrow), $\times 625$; *e*, prickles, $\times 1285$; *f*, costal silica bodies (sb), cork cells (cc), $\times 867$.

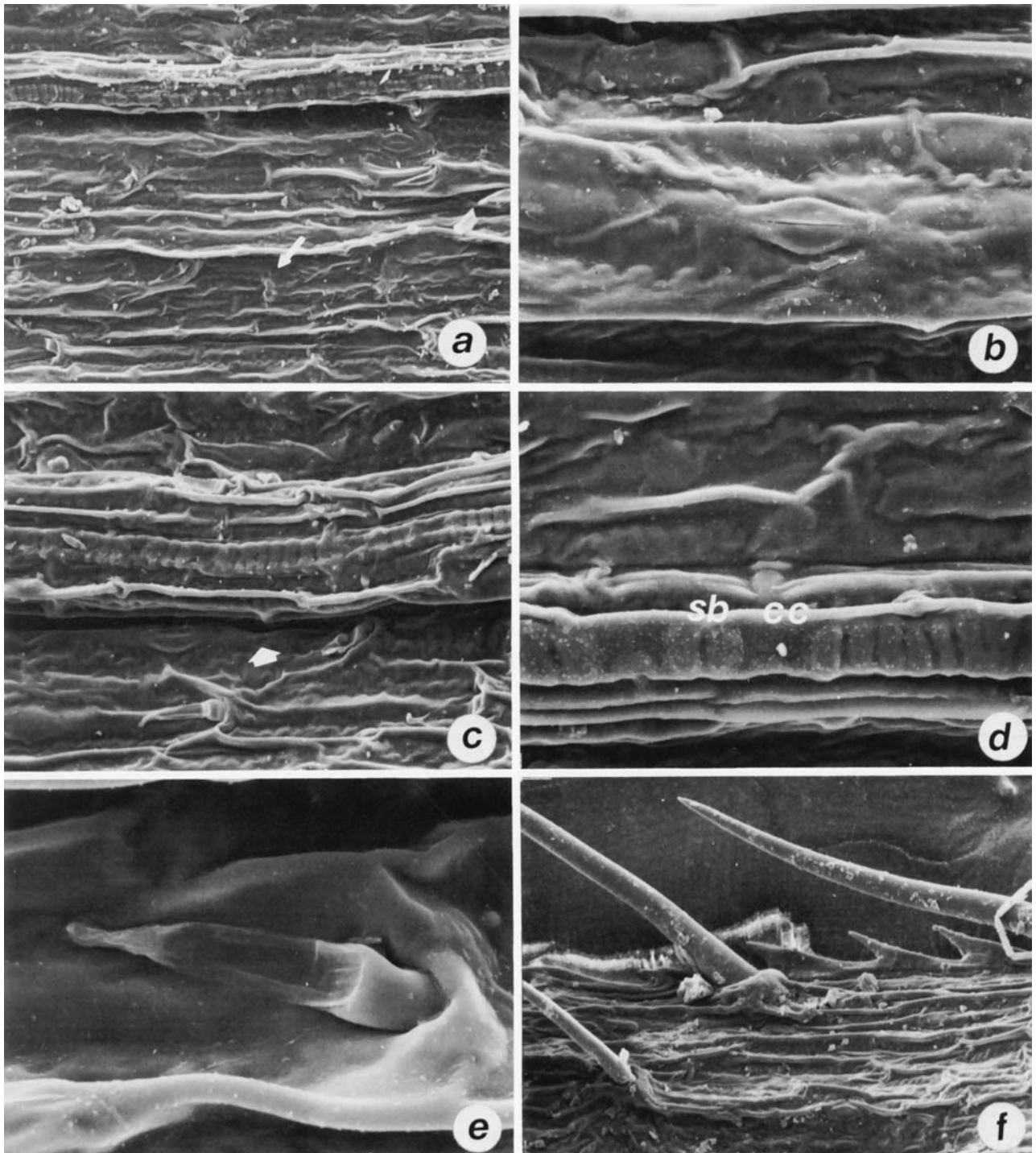


PLATE 65.—Abaxial epidermis *Paspalum conjugatum*, K.A. Lye 6171: *a*, overview, long cells, intercostal silica body (arrow), $\times 160$; *b*, stoma, $\times 640$; *c*, interstomatal cells (arrow), long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 640$; *e*, microhair, $\times 1250$; *f*, marginal prickles, macrohairs, $\times 160$.

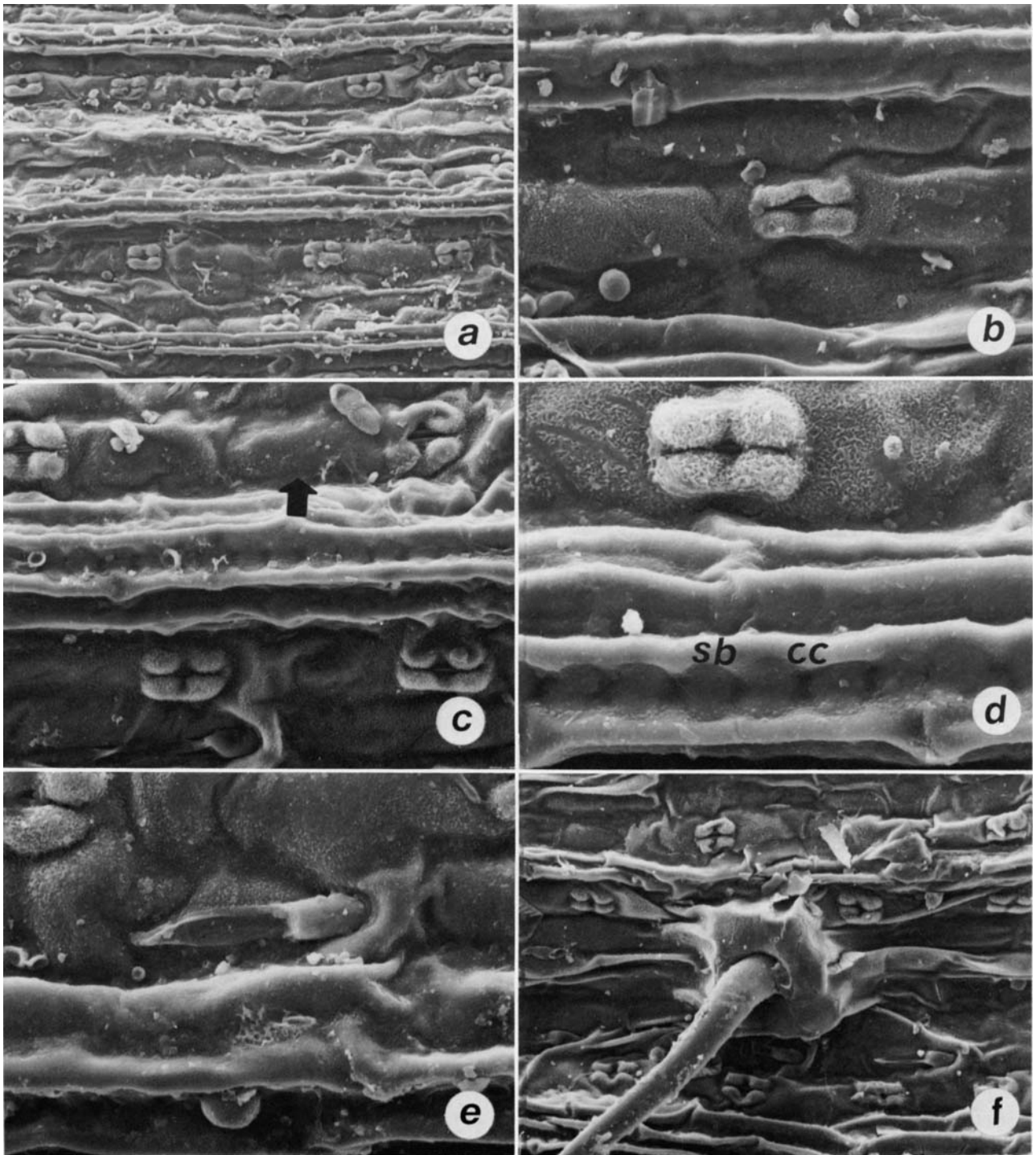


PLATE 66.—Adaxial epidermis *Paspalum conjugatum*, K.A. Lye 6171: *a*, overview, long cells, $\times 240$; *b*, stoma, $\times 640$; *c*, interstomatal cells (arrow), $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 1250$; *e*, microhair, $\times 960$; *f*, base of macrohair, $\times 320$.

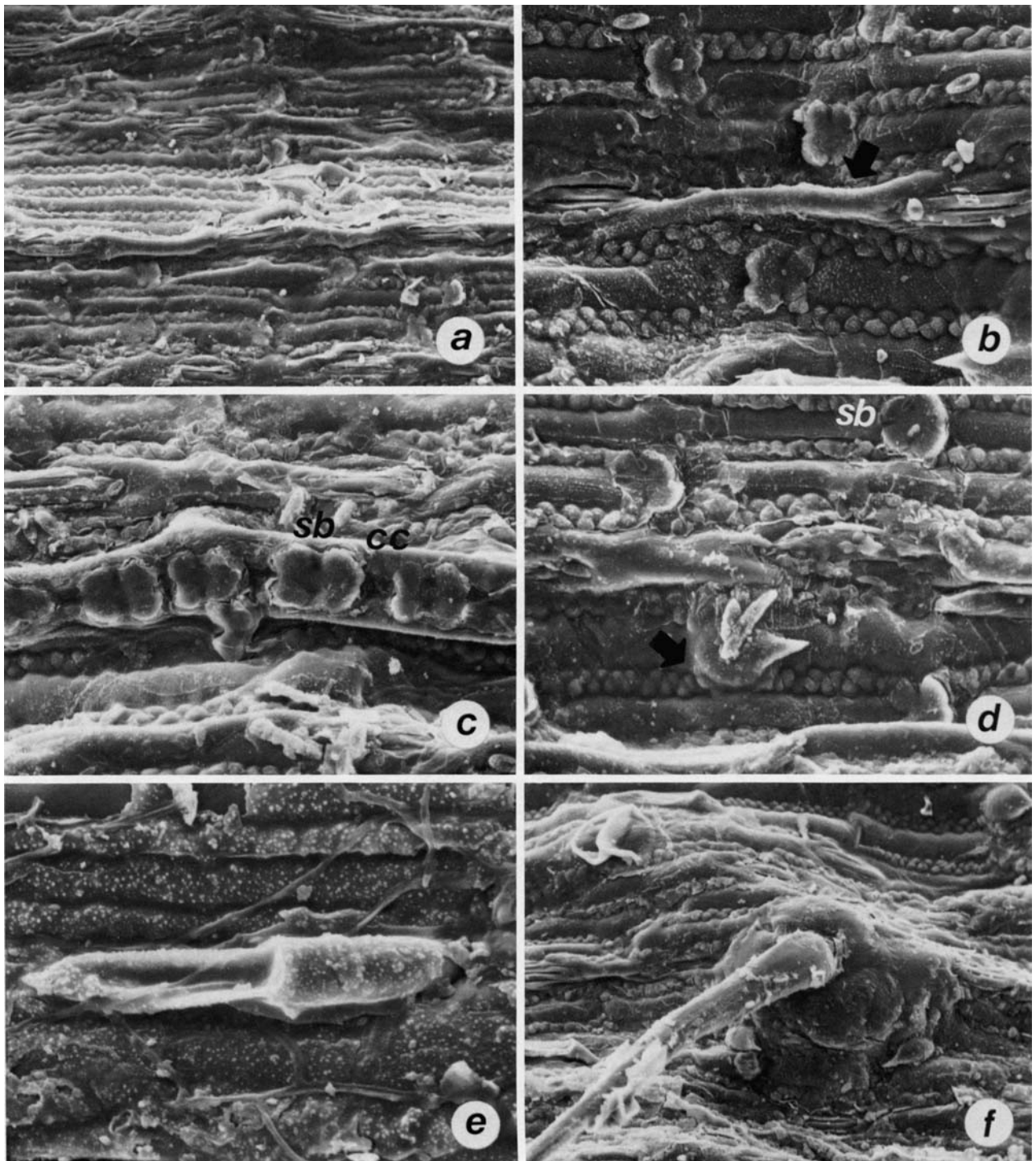


PLATE 67.—Abaxial epidermis *Pennisetum purpureum*, Liebenberg 489: *a*, overview, $\times 295$; *b*, stoma, interstomatal cell (arrow), $\times 625$; *c*, costal silica bodies (sb), cork cells (cc), $\times 1285$; *d*, long cells, intercostal silica bodies (sb), hook (arrow), $\times 867$; *e*, microhair, $\times 1285$; *f*, base of macrohair, $\times 295$.

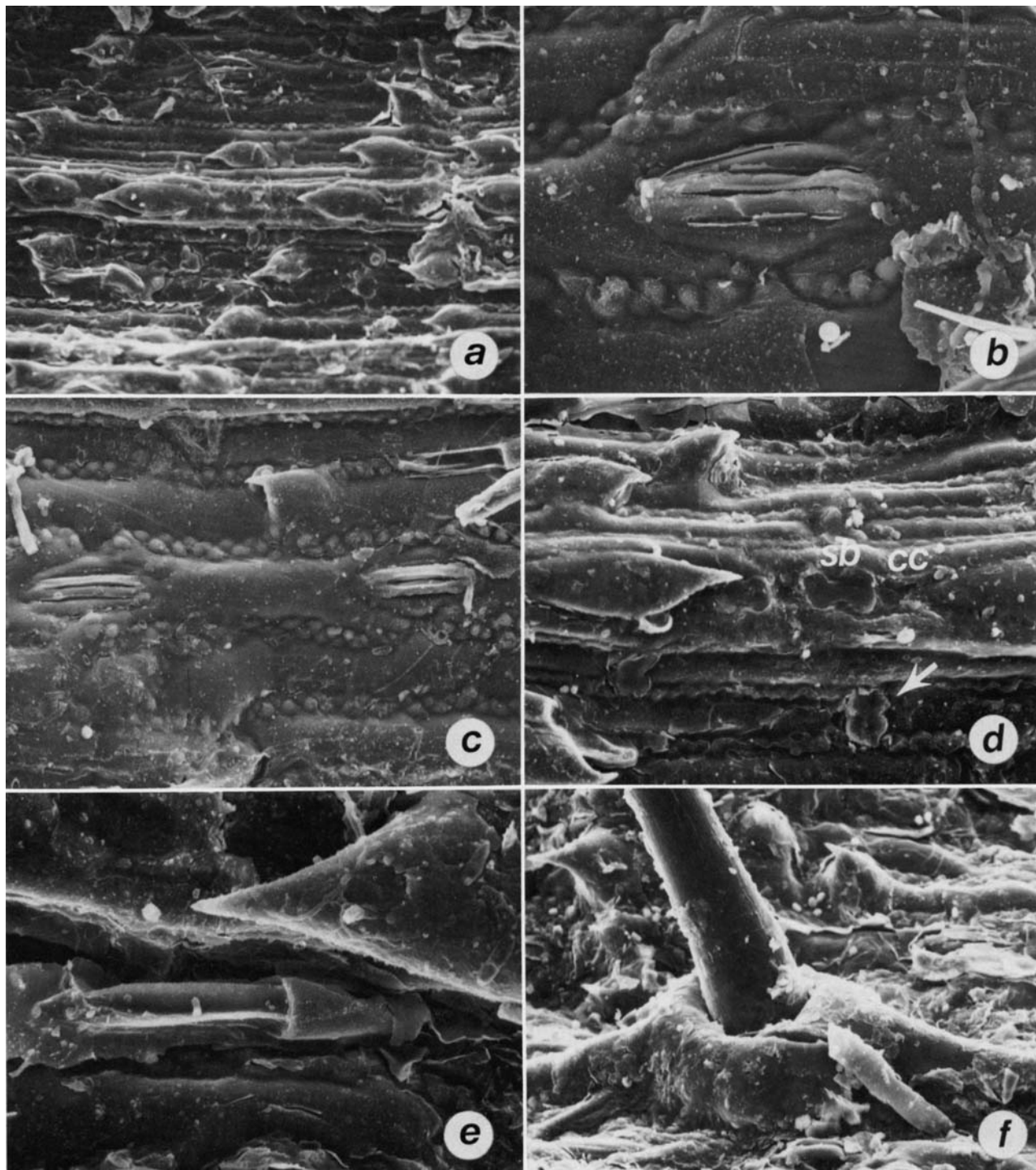


PLATE 68.—Adaxial epidermis *Pennisetum purpureum*, Liebenberg 489: *a*, overview, prickles, $\times 288$; *b*, stoma, $\times 1063$; *c*, interstomatal cell, long cells, $\times 544$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 576$; *e*, microhair, $\times 1125$; *f*, base of macrohair, $\times 576$.

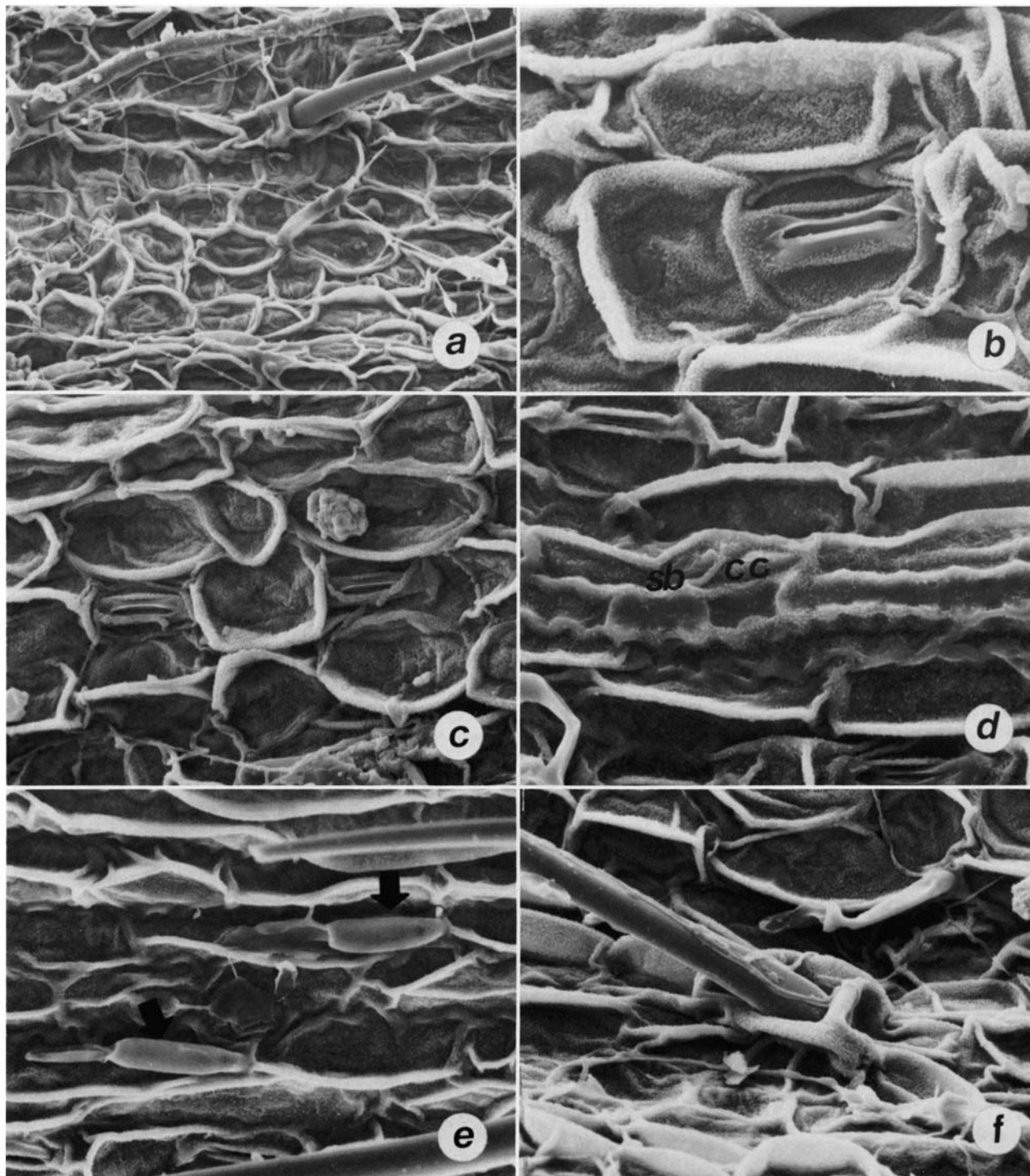


PLATE 69.—Abaxial epidermis *Pseudechinolaena polystachya*, Mwasumbi, Harris & Tadro 10830: *a*, overview, long cells, $\times 384$; *b*, stoma, $\times 768$; *c*, interstomatal cell, $\times 768$; *d*, costal silica bodies (sb), cork cells (cc), $\times 960$; *e*, microhairs (arrow), $\times 640$; *f*, base of macrohair, $\times 832$.

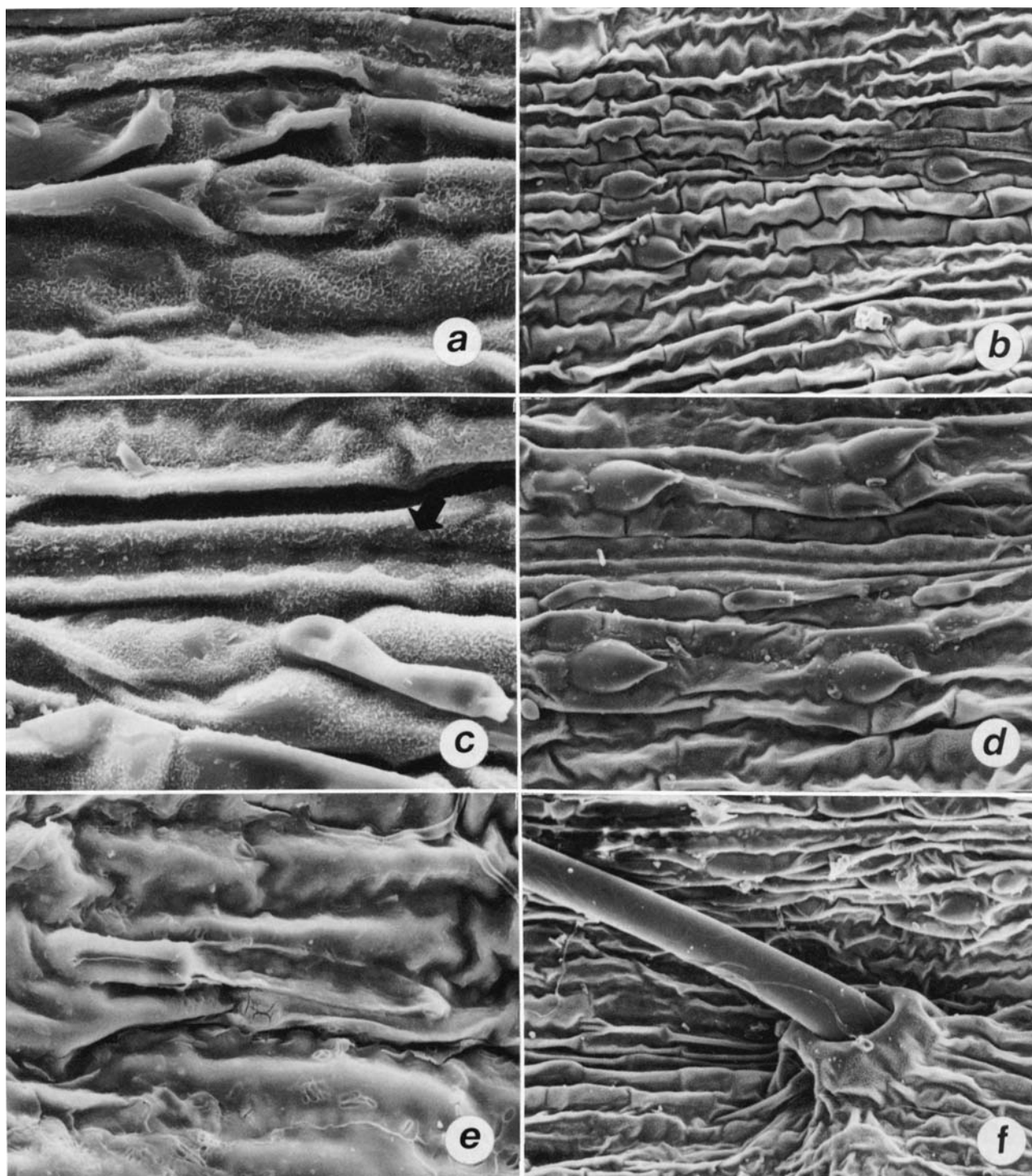


PLATE 70.—Adaxial epidermis *Pseudechinolaena polystachya*, Mwasumbi, Harris & Tadro 10830 (*a-c, f*); Magogo 1537 (*d, e*): *a*, stoma, $\times 1250$; *b*, long cells, $\times 320$; *c*, costal silica bodies (arrow), $\times 1250$; *d*, microhairs, prickles, $\times 416$; *e*, microhair, $\times 960$; *f*, base of macrohair, $\times 320$.

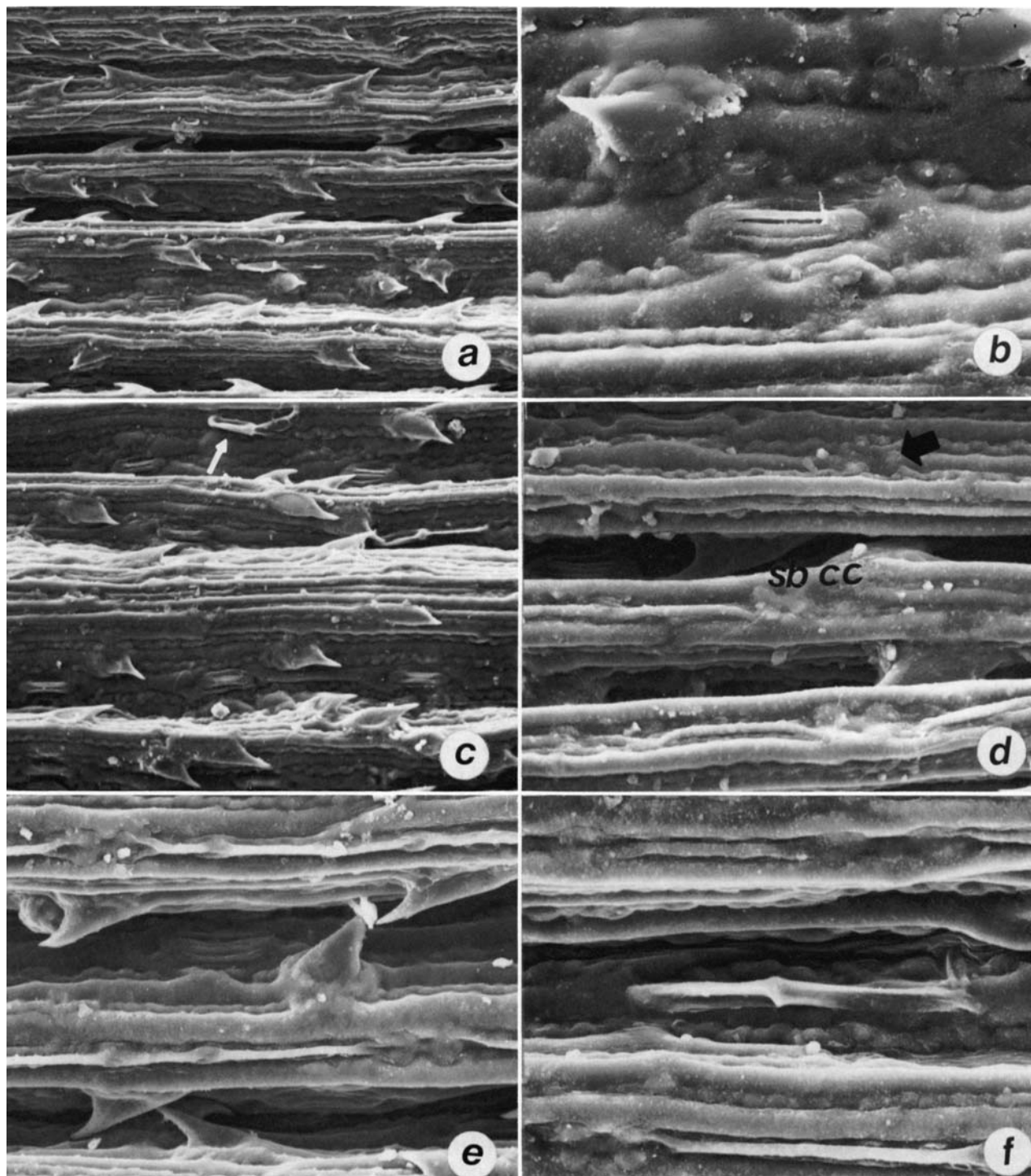


PLATE 71.—Abaxial epidermis *Rhynchelytrum kallimorphon*, Milne-Redhead and Taylor 9423: *a*, overview, prickles, $\times 240$; *b*, stoma, $\times 960$; *c*, prickles, microhairs (arrow), $\times 320$; *d*, long cells, costal silica bodies (sb), cork cells (cc), intercostal cork cell (arrow), $\times 640$; *e*, long cells, prickles, $\times 640$; *f*, microhair, $\times 960$.

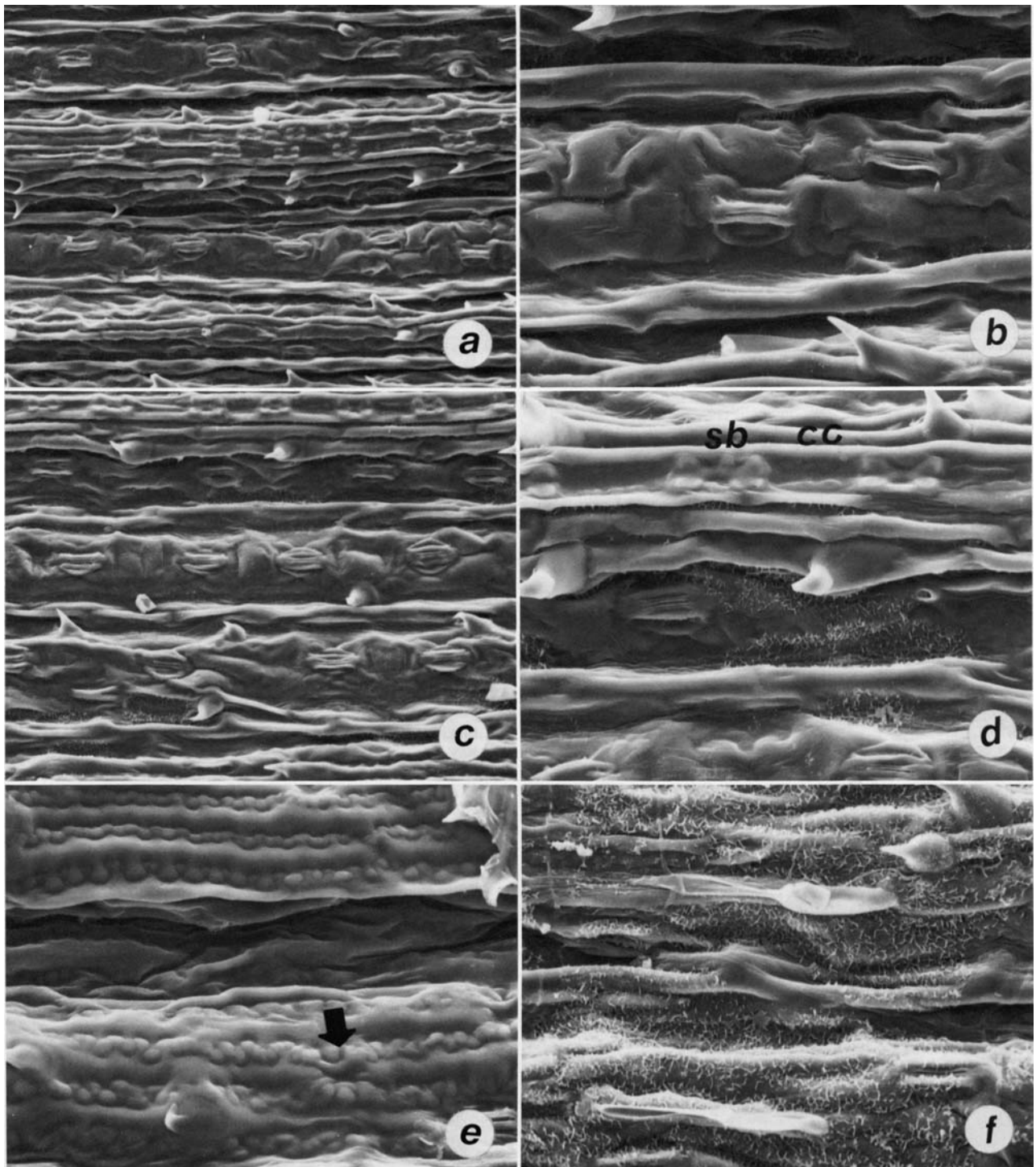


PLATE 72.—Adaxial epidermis *Rhynchelytrum kallimorphon*, Milne-Redhead and Taylor 9423: *a*, overview, $\times 240$; *b*, stomata, $\times 640$; *c*, stomata, interstomatal cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, long cells, intercostal cork cell (arrow), $\times 640$; *f*, microhairs (arrow), $\times 640$.

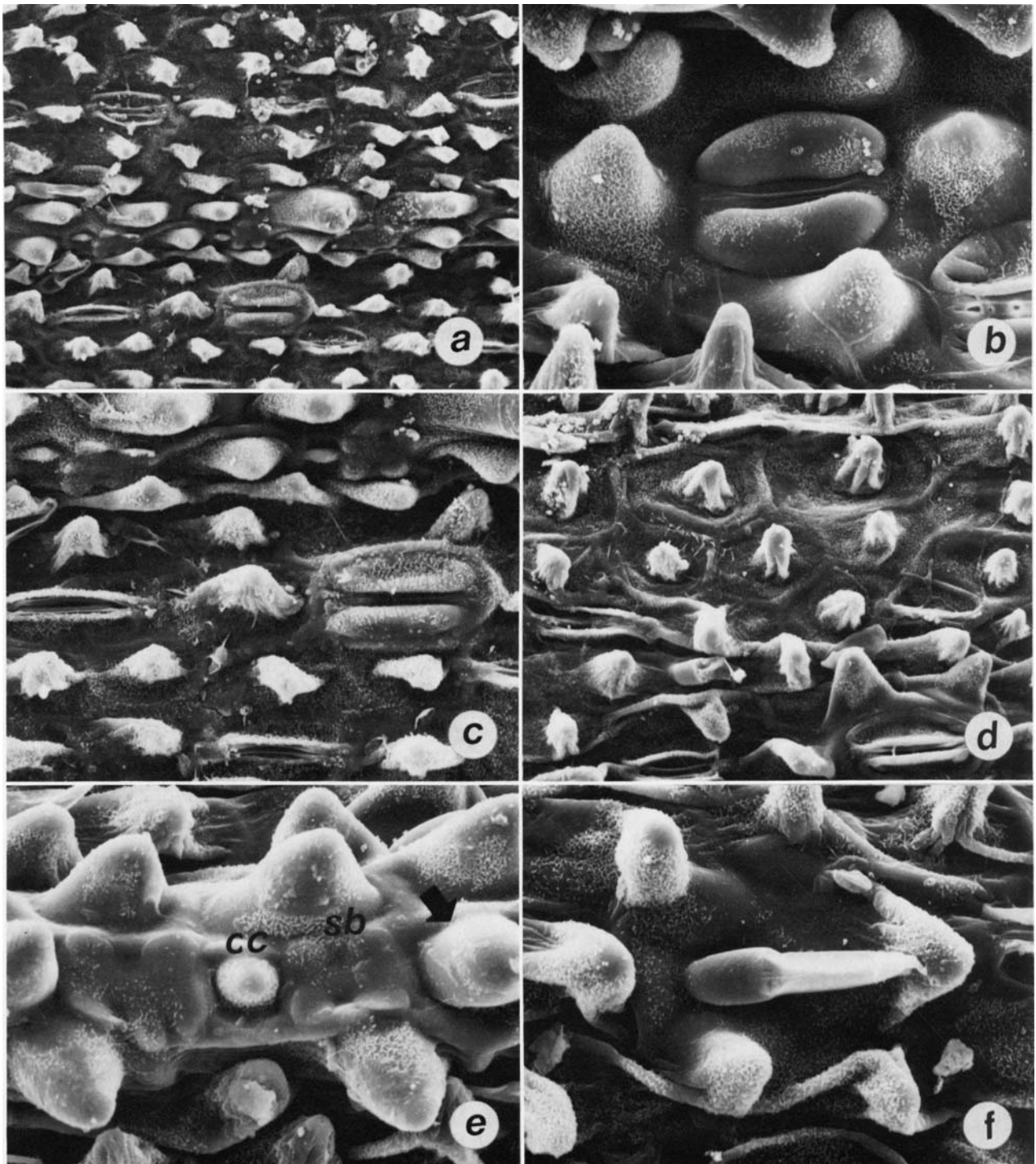


PLATE 73.—Abaxial epidermis *Sacciolepis africana*, Thomas 4544: *a*, overview, $\times 416$; *b*, stoma, $\times 1250$; *c*, interstomatal cell, $\times 832$; *d*, long cells, $\times 640$; *e*, costal silica bodies (sb), cork cell (cc), costal papillate prickles (arrow), $\times 1250$; *f*, microhair, $\times 1250$.

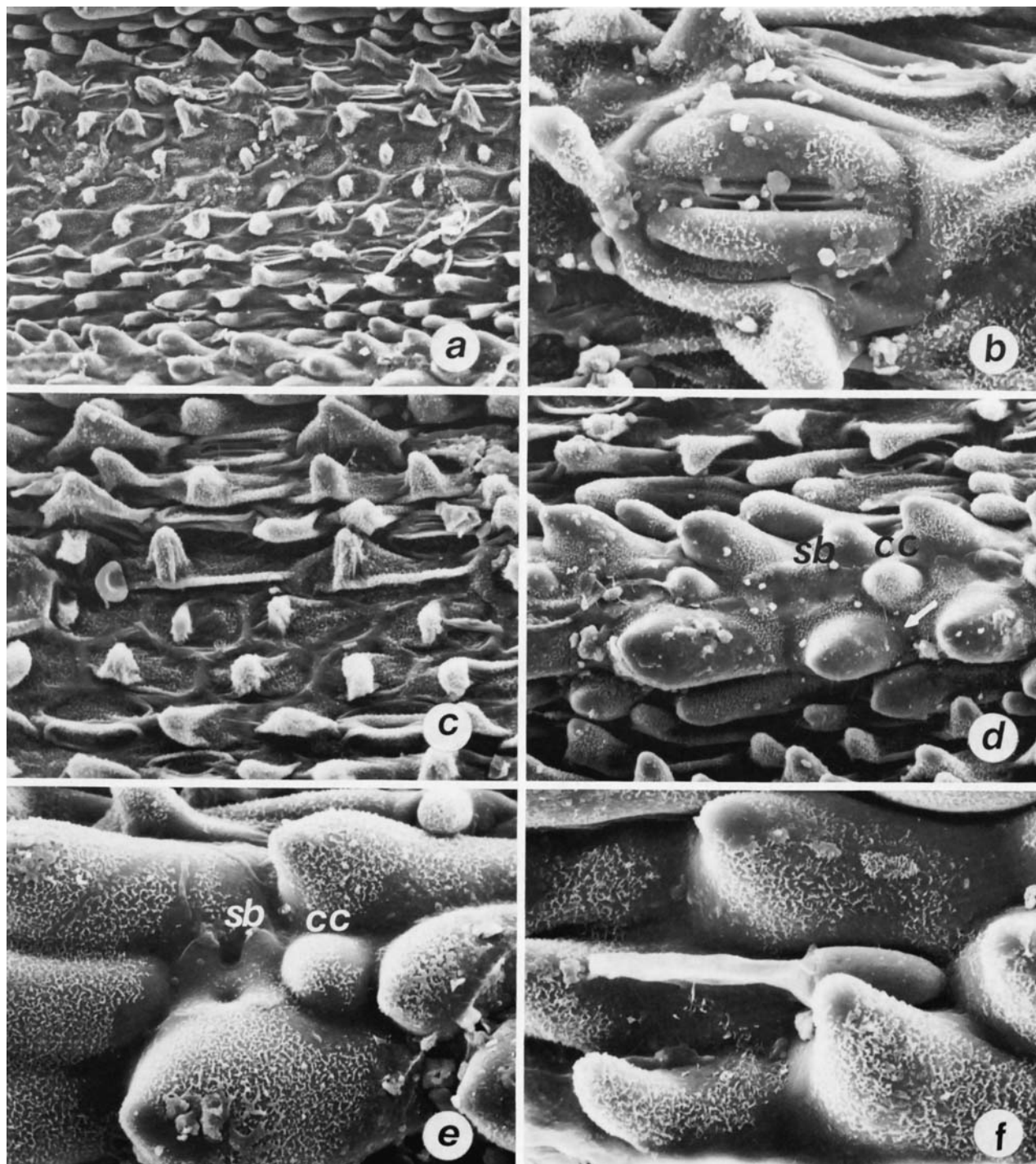


PLATE 74.—Adaxial epidermis *Sacciolepis africana*, Thomas 4544: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, long cells, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), papillate prickles (arrow), $\times 640$; *e*, costal silica body (sb) cork cell (cc), $\times 1250$; *f*, microhair, $\times 1625$.

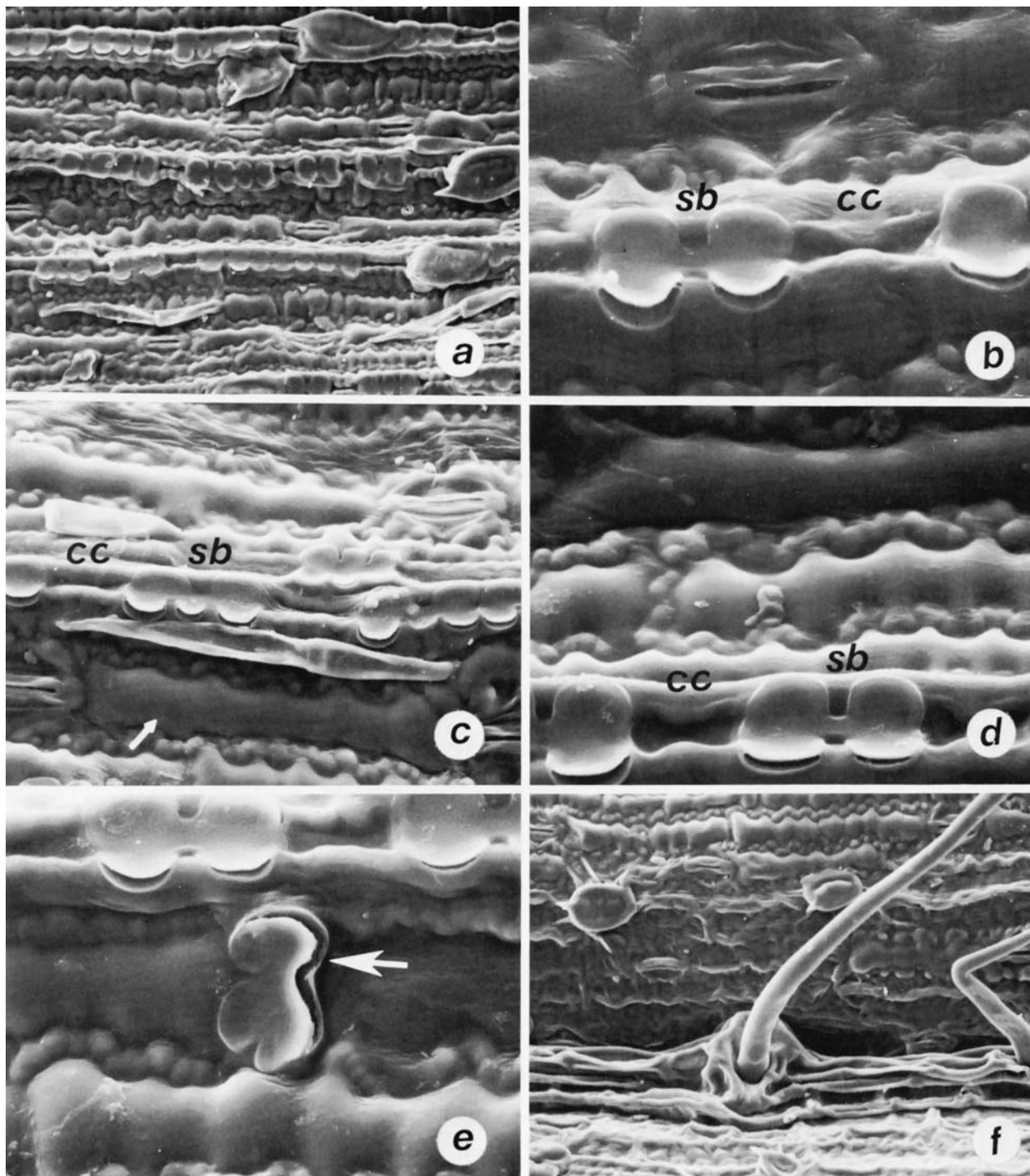


PLATE 75.—Abaxial epidermis *Setaria plicatilis*, Hitchcock 24746: *a*, overview, costal prickles, $\times 320$; *b*, stoma, costal silica bodies (sb), cork cells (cc), $\times 1250$; *c*, interstomatal cell (arrow), microhair, costal silica bodies (sb), cork cells (cc), $\times 640$; *d*, long cells, costal silica bodies (sb), cork cells (cc), $\times 1250$; *e*, intercostal silica body (arrow), $\times 1250$; *f*, macrohair, $\times 320$.

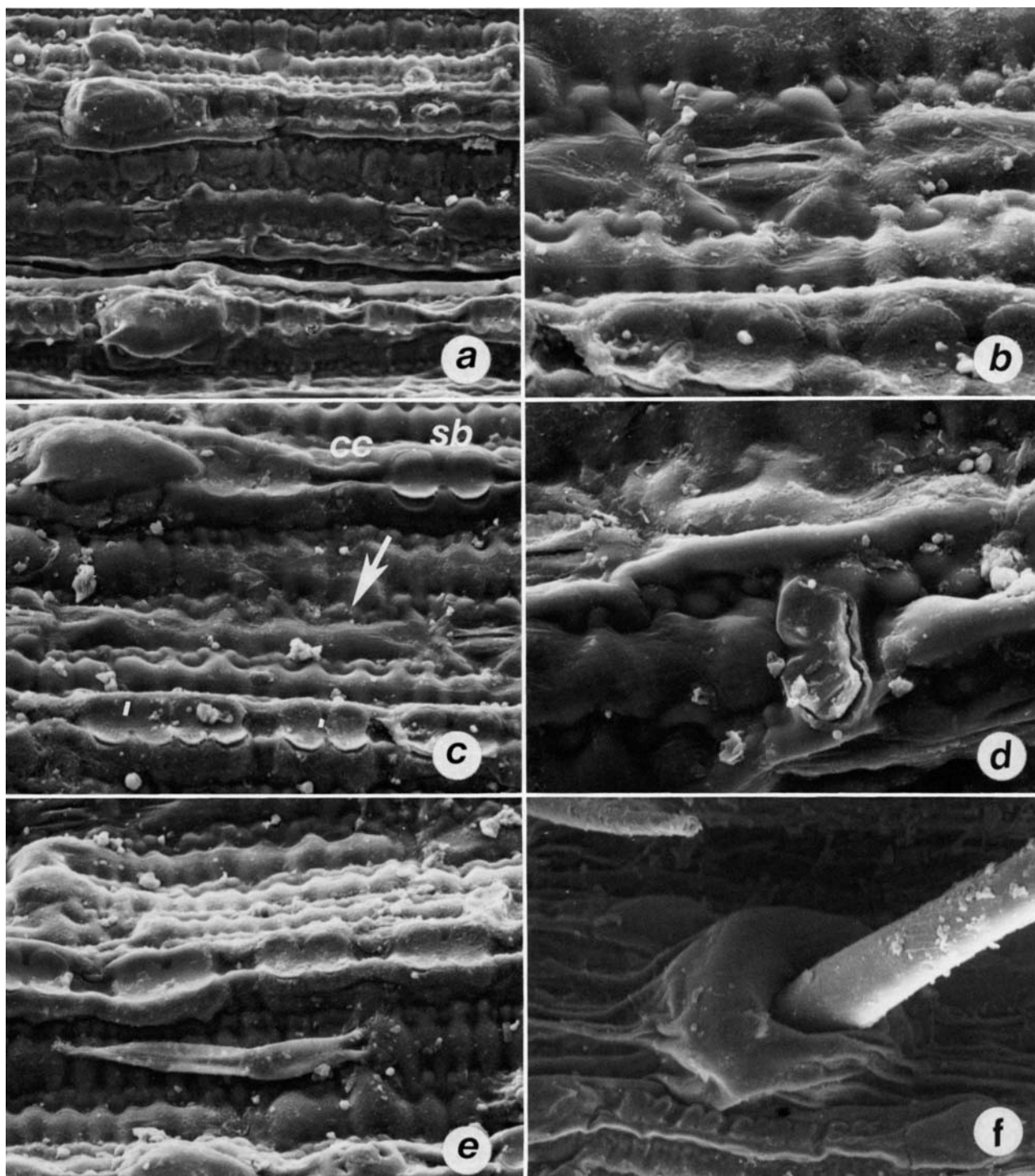


PLATE 76.—Adaxial epidermis *Setaria plicatilis*, Hitchcock 24746: *a*, overview, costal prickles, $\times 320$; *b*, stoma, long cells, $\times 1250$; *c*, interstomatal cell (arrow), costal silica bodies (sb), cork cells (cc), $\times 640$; *d*, intercostal silica body, $\times 1250$; *e*, microhair, $\times 640$; *f*, base of macrohair, $\times 320$.

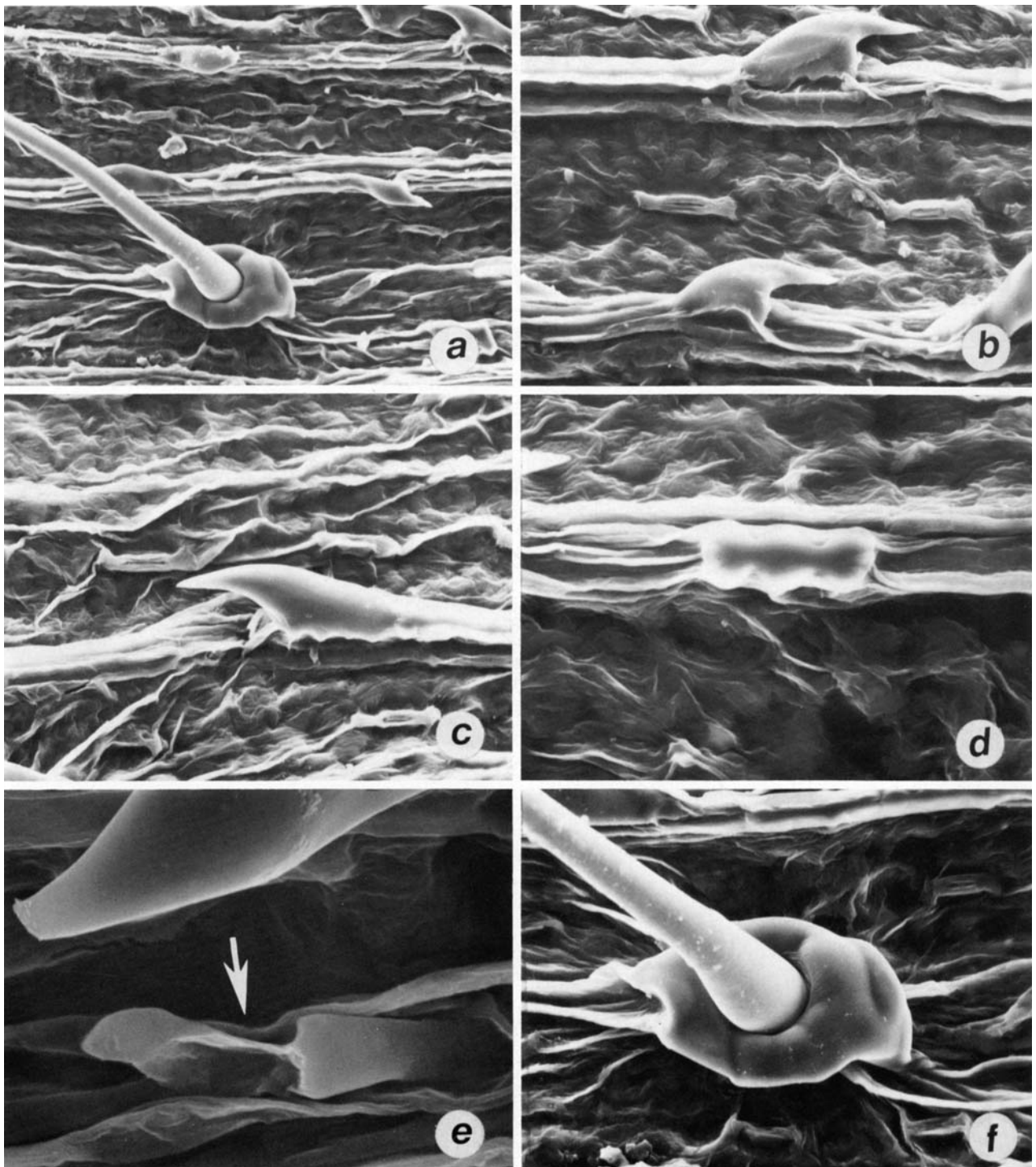


PLATE 77.—Abaxial epidermis *Snowdenia pettitiana*, Thomas 2573: *a*, overview, macrohair, $\times 320$; *b*, stomata, interstomatal cell, long cells, costal prickles, $\times 640$; *c*, costal prickly cell, long cells, $\times 640$; *d*, costal silica body, $\times 1250$; *e*, microhair (arrow), $\times 2970$; *f*, base of macrohair, $\times 640$.

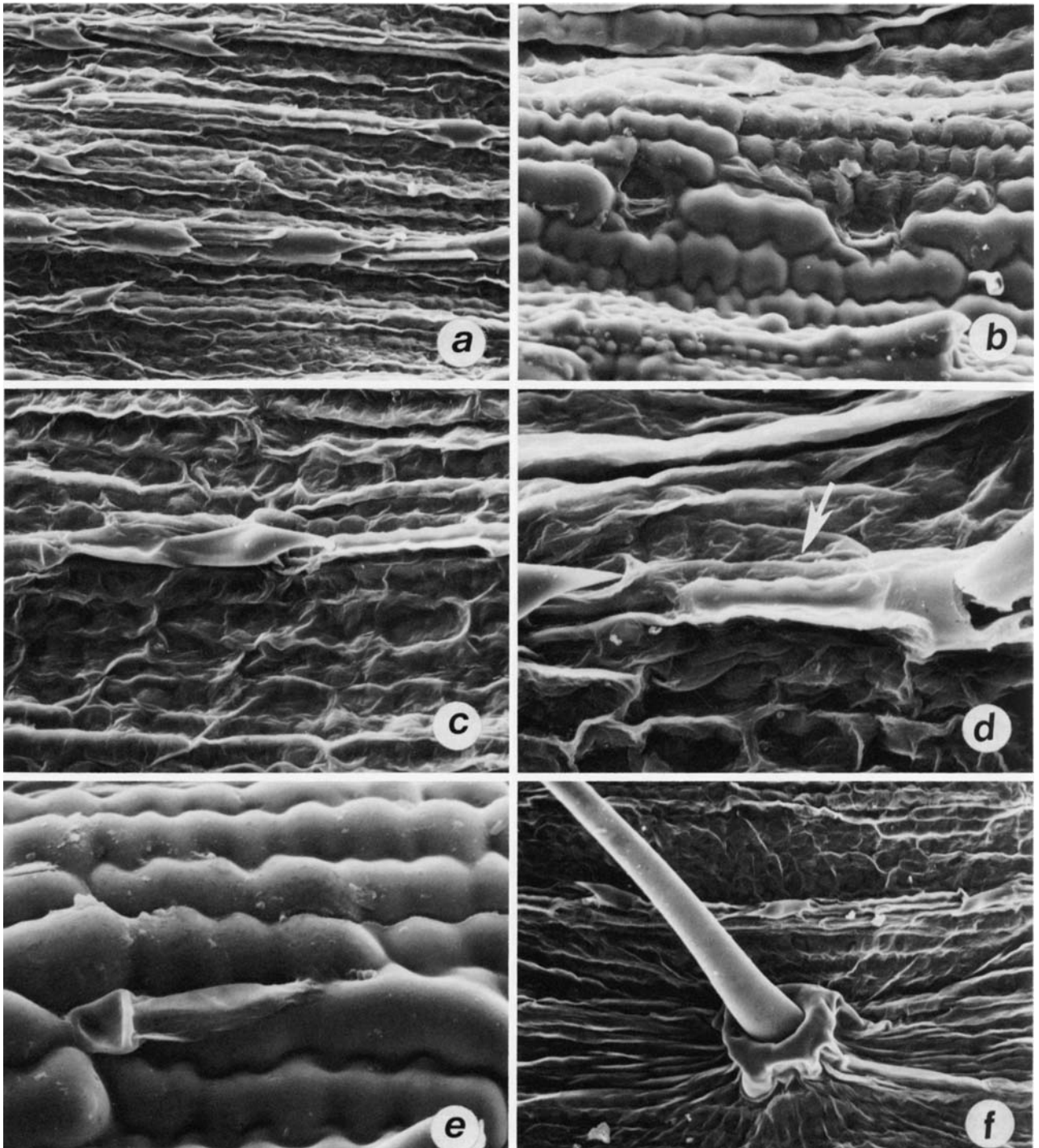


PLATE 78.—Adaxial epidermis *Snowdenia petitiiana*, Thomas 2573: *a*, overview, costal prickles, $\times 320$; *b*, stomata, interstomatal cell, long cells (near margin), $\times 640$; *c*, long cells, costal prickple, $\times 640$; *d*, costal silica body (arrow), long cells, $\times 1250$; *e*, microhair (near margin), $\times 1250$; *f*, base of macrohair, $\times 320$.

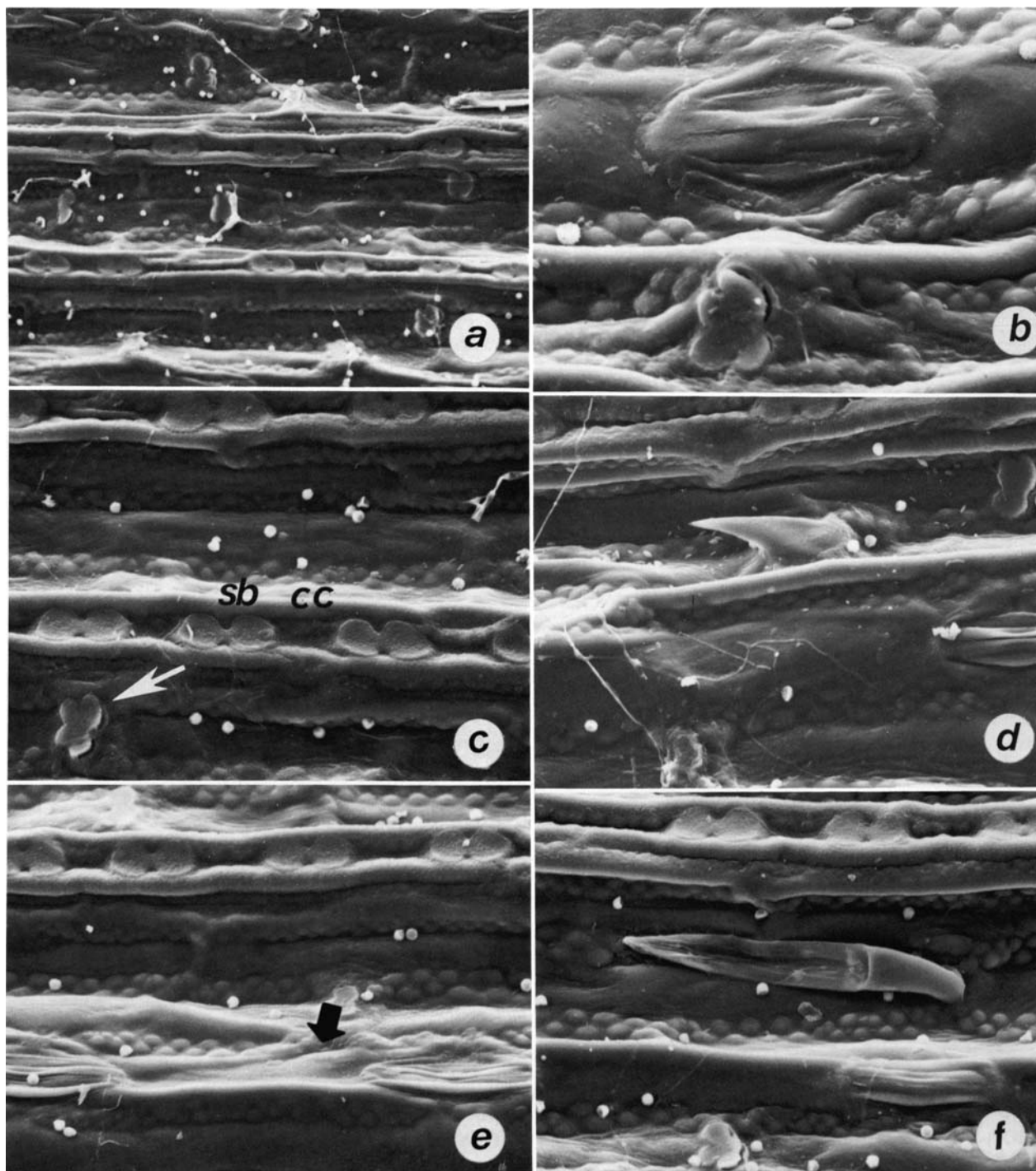


PLATE 79.—Abaxial epidermis *Stenotaphrum dimidiatum*, Allan 145: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, intercostal silica body (arrow), costal silica bodies (sb), cork cells (cc), $\times 640$; *d*, intercostal prickle, $\times 640$; *e*, interstomatal cell (arrow), long cells, $\times 640$; *f*, microhair, $\times 640$.

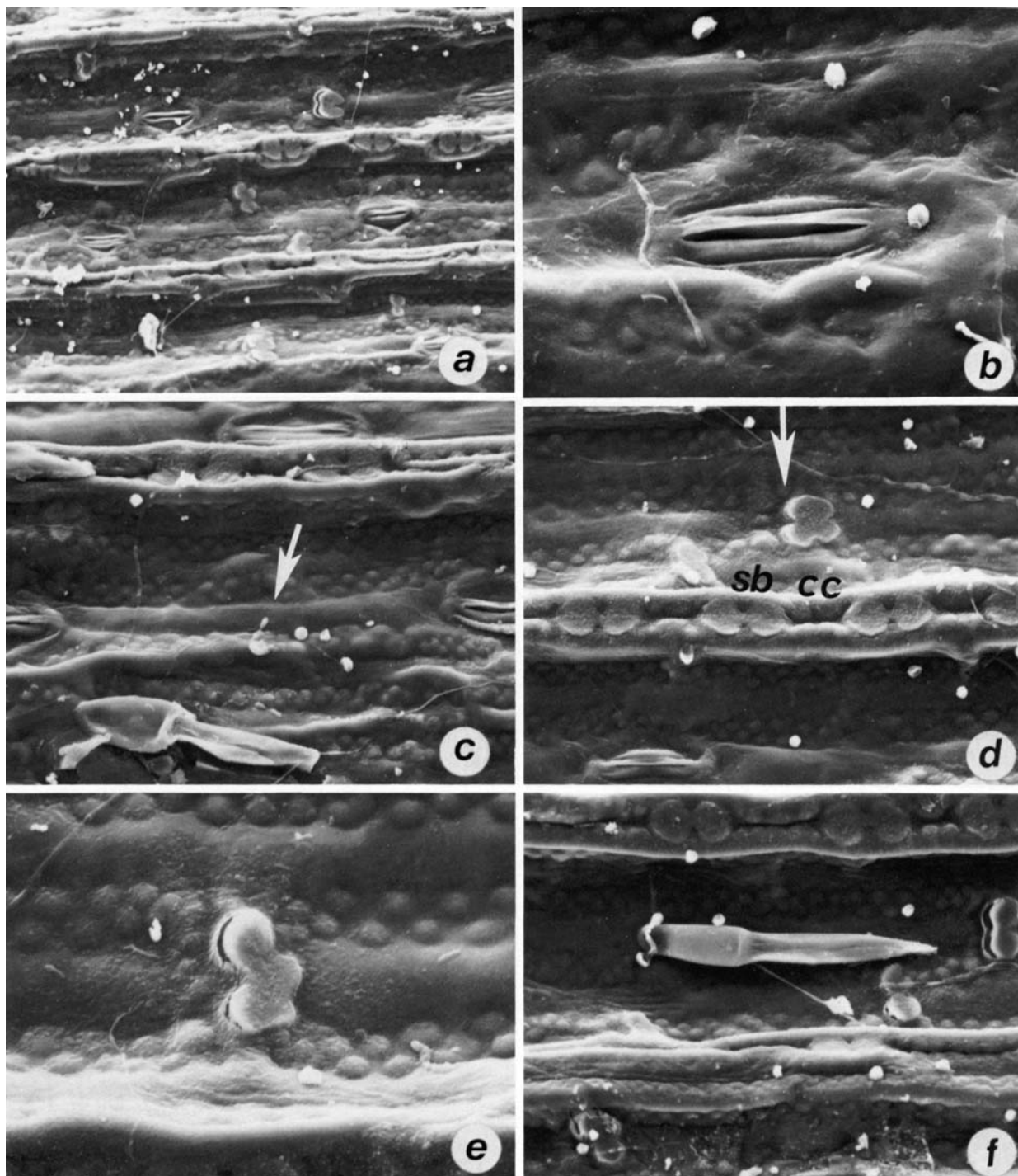


PLATE 80.—Adaxial epidermis *Stenotaphrum dimidiatum*, Allan 145: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cell (arrow), long cells, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), paired intercostal short cells (arrow), $\times 640$; *e*, intercostal silica body, $\times 1250$; *f*, microhair, $\times 640$.

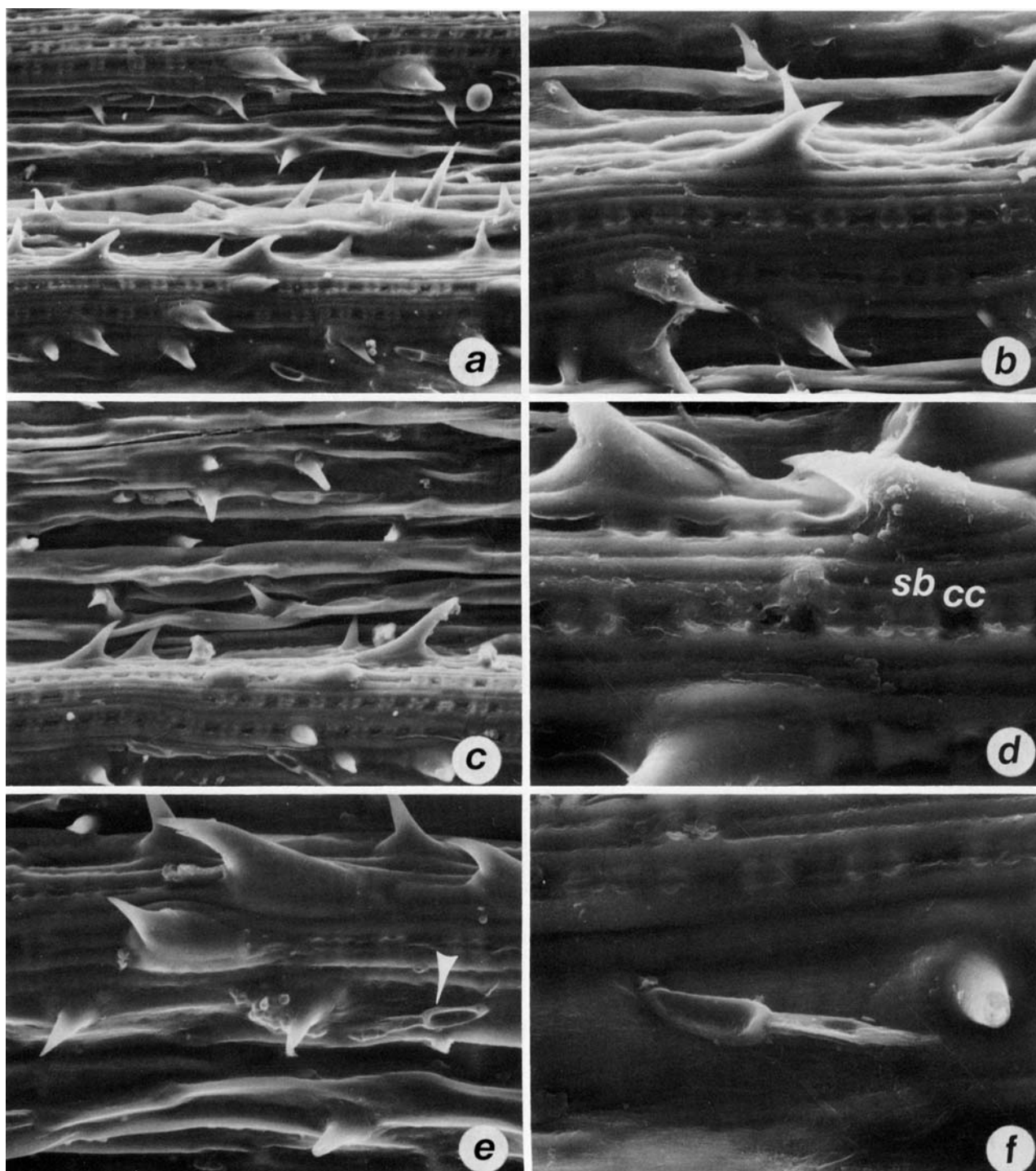


PLATE 81.—Abaxial epidermis *Stereochlaena caespitosa*, Faulkner 1424: *a*, overview, prickles, $\times 160$; *b*, long cells, prickles, $\times 320$; *c*, long cells, intercostal prickles and hooks, $\times 192$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, costal prickles, microhair (arrow), $\times 320$; *f*, microhair, $\times 640$.

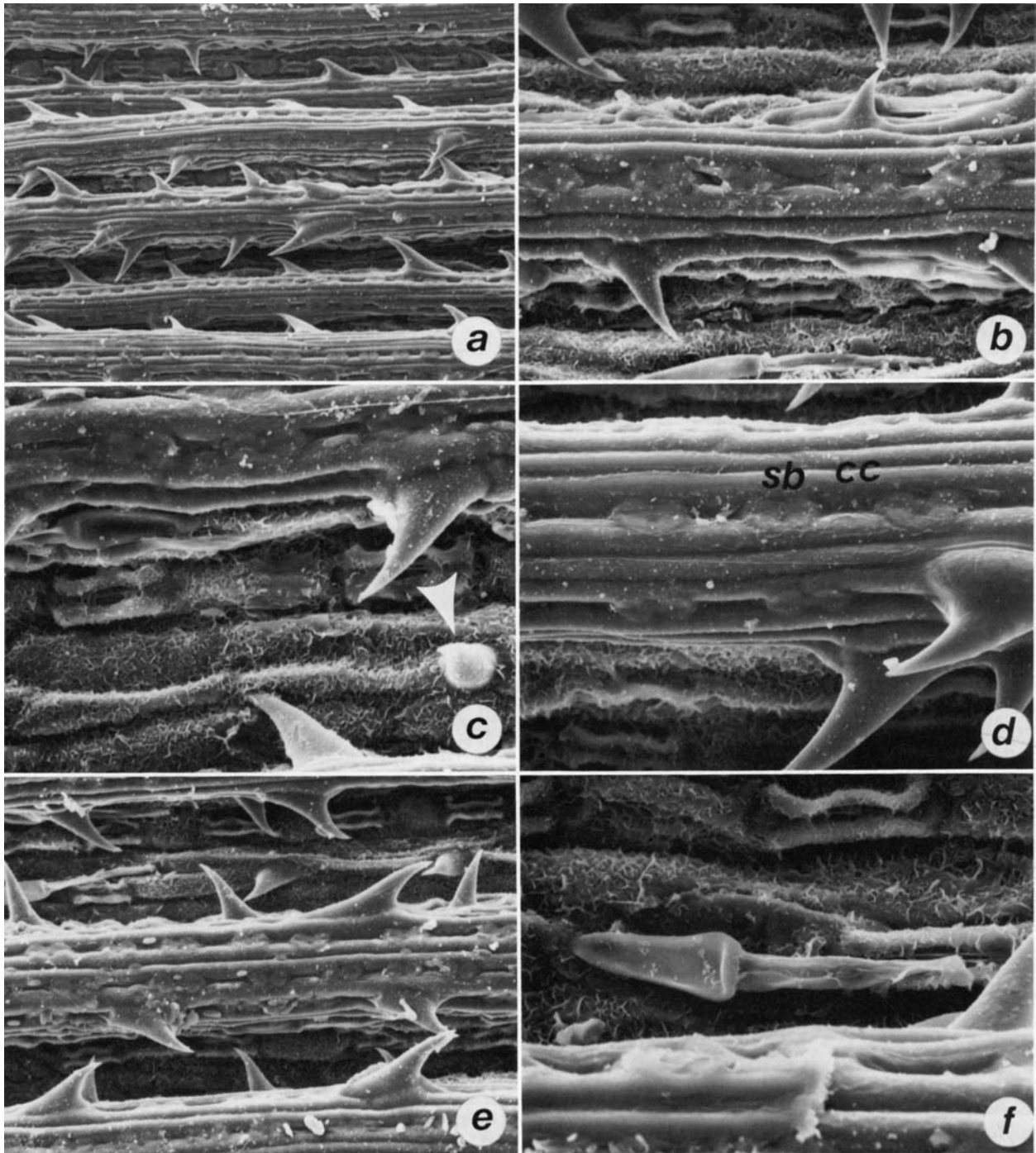


PLATE 82.—Adaxial epidermis *Stereochlaena caespitosa*, Faulkner 1424: *a*, overview, $\times 160$; *b*, costal zone, prickles, $\times 480$; *c*, interstomatal cell, long cells, intercostal hook (arrow), $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), $\times 640$; *e*, costal silica bodies, cork cells, $\times 320$; *f*, microhair, $\times 960$.

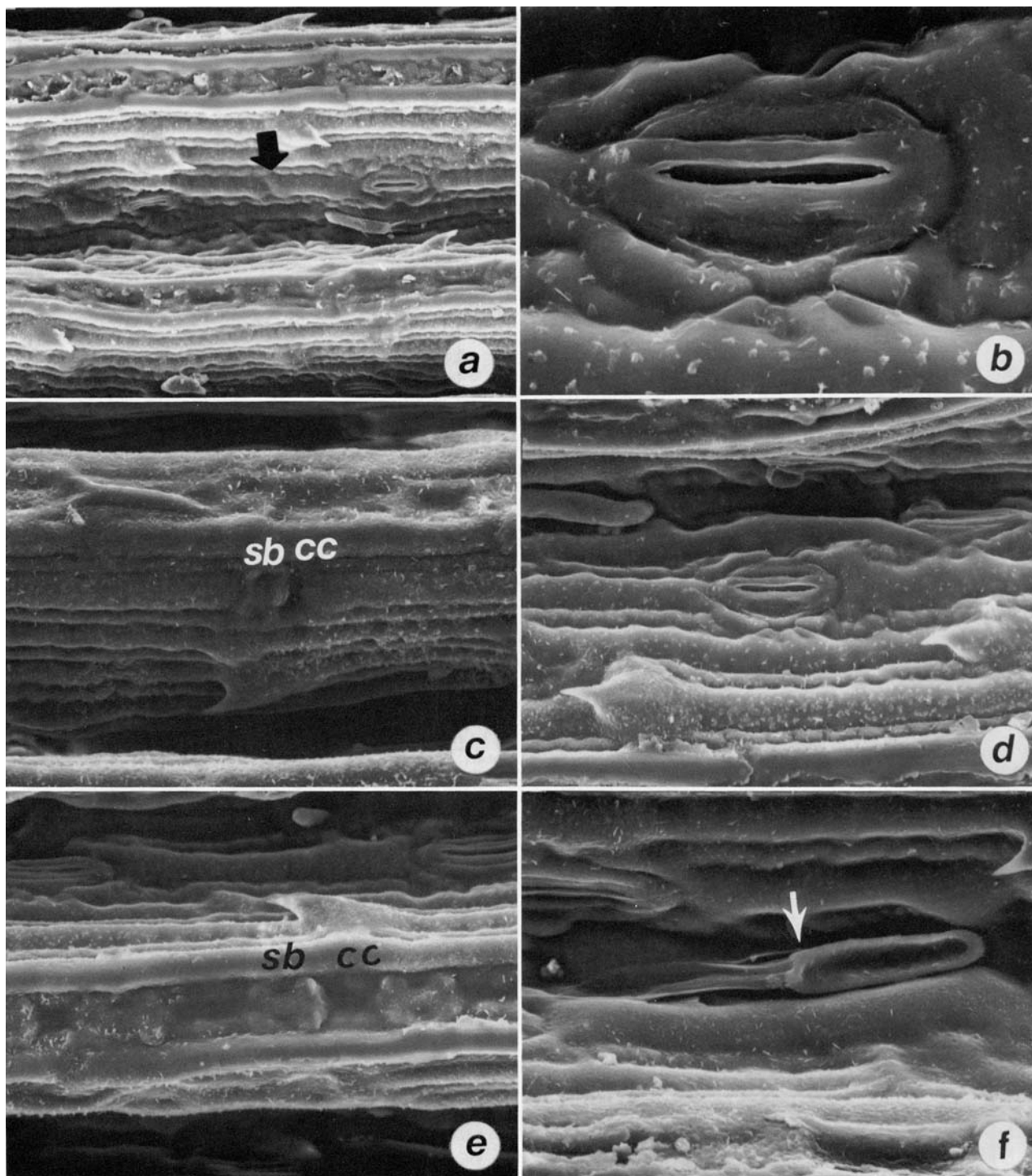


PLATE 83.—Abaxial epidermis *Tricholaena teneriffae*, Dyson-Hudson 6: *a*, overview, interstomatal cell (arrow) $\times 320$; *b*, stoma, $\times 1875$; *c*, long cells, intercostal silica body (sb), cork cell (cc), $\times 640$; *d*, long cells, intercostal prickles, $\times 640$; *e*, costal silica bodies (sb), cork cells (cc), $\times 640$; *f*, microhair (arrow), $\times 960$.

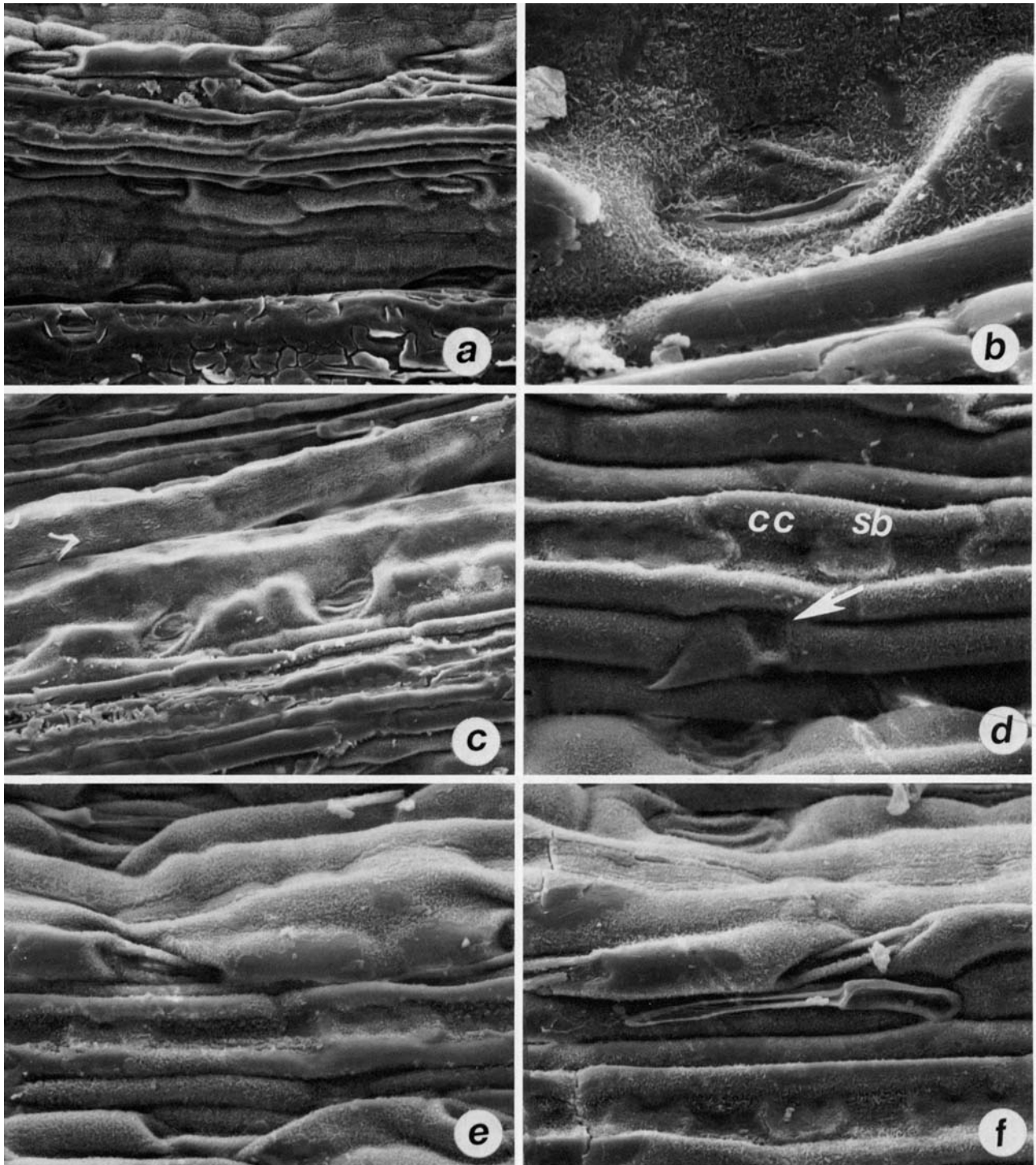


PLATE 84.—Adaxial epidermis *Tricholaena teneriffae*, Dyson-Hudson 6: *a*, overview, $\times 320$; *b*, stoma, $\times 1250$; *c*, interstomatal cell, long cells, $\times 320$; *d*, costal silica bodies (sb), cork cells (cc), intercostal cork cell (arrow), $\times 640$; *e*, long cells, costal short cells, $\times 640$; *f*, microhair, $\times 640$.

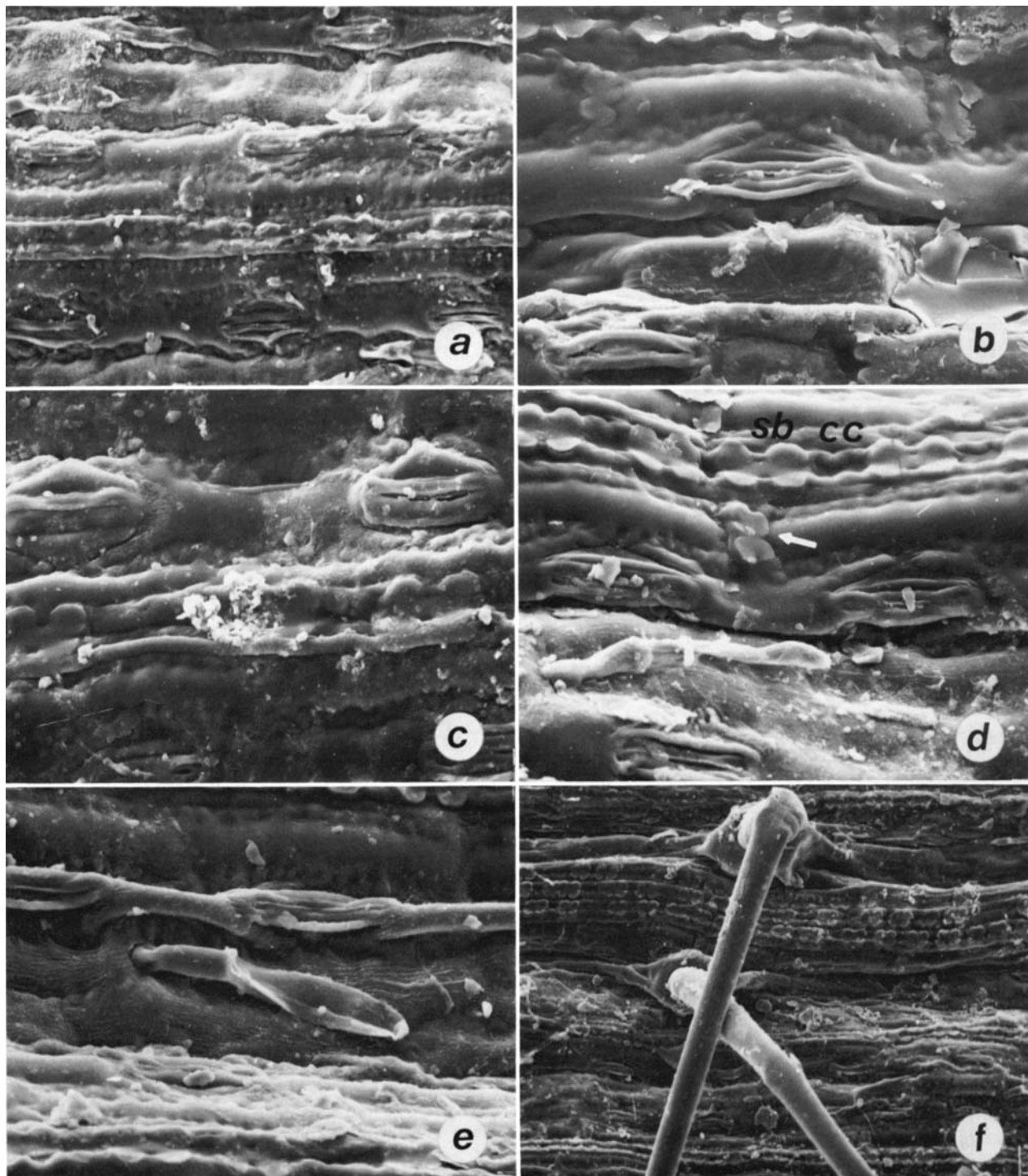


PLATE 85.—Abaxial epidermis *Urochloa mosambicensis*, Brooks G104: *a*, overview, $\times 320$; *b*, stoma, $\times 640$; *c*, interstomatal cell, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 640$; *e*, microhair, $\times 640$; *f*, macrohairs, $\times 160$.

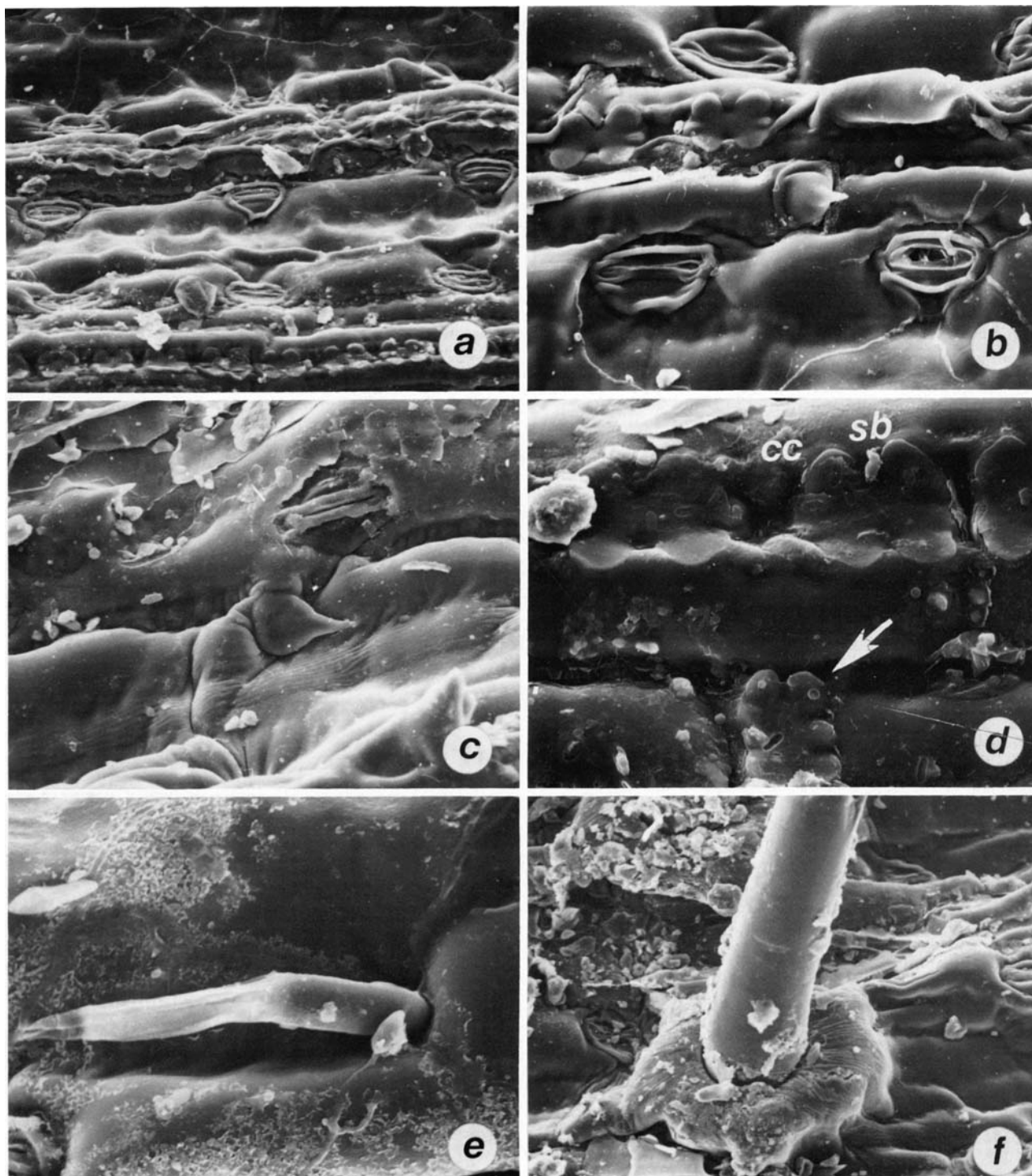


PLATE 86.—Adaxial epidermis *Urochloa mosambicensis*, Brooks G104: *a*, overview, $\times 320$; *b*, interstomatal cell, $\times 640$; *c*, long cells, intercostal hook, $\times 640$; *d*, costal silica bodies (sb), cork cells (cc), intercostal silica body (arrow), $\times 1250$; *e*, microhair, $\times 1250$; *f*, base of macrohair, $\times 320$.

Index to Grass Species

- Acritochaete volkensis*, 8, 52 (pl.), 53 (pl.)
Acroceras zizanioides, 8, 54 (pl.), 55 (pl.)
Alloteropsis angusta, 9, 56 (pl.), 57 (pl.)
Anthephora elongata, 10, 58 (pl.), 59 (pl.)
Arundinella nepalensis, 2, 34 (pl.), 35 (pl.)
Axonopus flexuosus, 10, 60 (pl.), 61 (pl.)
Brachiaria brizantha, 11, 62 (pl.), 63 (pl.)
Cenchrus ciliaris, 11, 64 (pl.), 65 (pl.)
Chaetopoa taylori, 12, 66 (pl.), 67 (pl.)
Chloachne oplismenoides, 13, 68 (pl.), 69 (pl.)
Chlorocalymma cryptacanthum, 13, 70 (pl.), 71 (pl.)
Coelachne africana, 6, 46 (pl.), 47 (pl.)
Cyrtococcum multinode, 14, 72 (pl.), 73 (pl.)
Digitaria diagonalis var. uniglumis, 15, 74 (pl.), 75 (pl.)
Eccoptocarpa obconiciventris, 15, 76 (pl.), 77 (pl.)
Echinochloa haploclada, 16, 78 (pl.), 79 (pl.)
Entolasia imbricata, 17, 80 (pl.), 81 (pl.)
Eriochloa meyerana, 17, 82 (pl.), 83 (pl.)
Gilglochloa indurata, 3, 36 (pl.), 37 (pl.)
Heteranthoecia guineensis, 6, 48 (pl.), 49 (pl.)
Holcolemma inaequale, 18, 84 (pl.), 85 (pl.)
Hylebates chlorochloe, 19, 86 (pl.), 87 (pl.)
- Isachne buettneri*, 7, 50 (pl.), 51 (pl.)
Loudetia arundinacea, 3, 38 (pl.), 39 (pl.)
Melinis ambigua, 19, 88 (pl.), 89 (pl.)
Odontelytrum abyssinicum, 20, 90 (pl.), 91 (pl.)
Oplismenus burmannii, 21, 92 (pl.), 93 (pl.)
Panicum trichoides, 21, 94 (pl.), 95 (pl.)
Paspalidium geminatum, 22, 96 (pl.), 97 (pl.)
Paspalum conjugatum, 23, 98 (pl.), 99 (pl.)
Pennisetum purpureum, 23, 100 (pl.), 101 (pl.)
Pseudechinolaena polystachya, 24, 102 (pl.), 103 (pl.)
Rhynchelytrum kallimorphon, 25, 104 (pl.), 105 (pl.)
Sacciolepis africana, 25, 106 (pl.), 107 (pl.)
Setaria plicatilis, 26, 108 (pl.), 109 (pl.)
Snowdenia petitiana, 27, 110 (pl.), 111 (pl.)
Stenotaphrum dimidiatum, 28, 112 (pl.), 113 (pl.)
Stereochlaena caespitosa, 28, 114 (pl.), 115 (pl.)
Tricholaena teneriffae, 29, 116 (pl.), 117 (pl.)
Trichopteryx stolziana, 4, 40 (pl.), 41 (pl.)
Tristachya bequaertii, 4, 42 (pl.), 43 (pl.)
Urochloa mosambicensis, 30, 118 (pl.), 119 (pl.)
Zonotriche inamoena, 5, 44 (pl.), 45 (pl.)