

" THE IDENTIFICATION of GRASSES by LEAF ANATOMY. "

T H E S I S

for the Doctorate of Science

- submitted by -

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P L A T E S

D. Sc. APRIL, 1935.

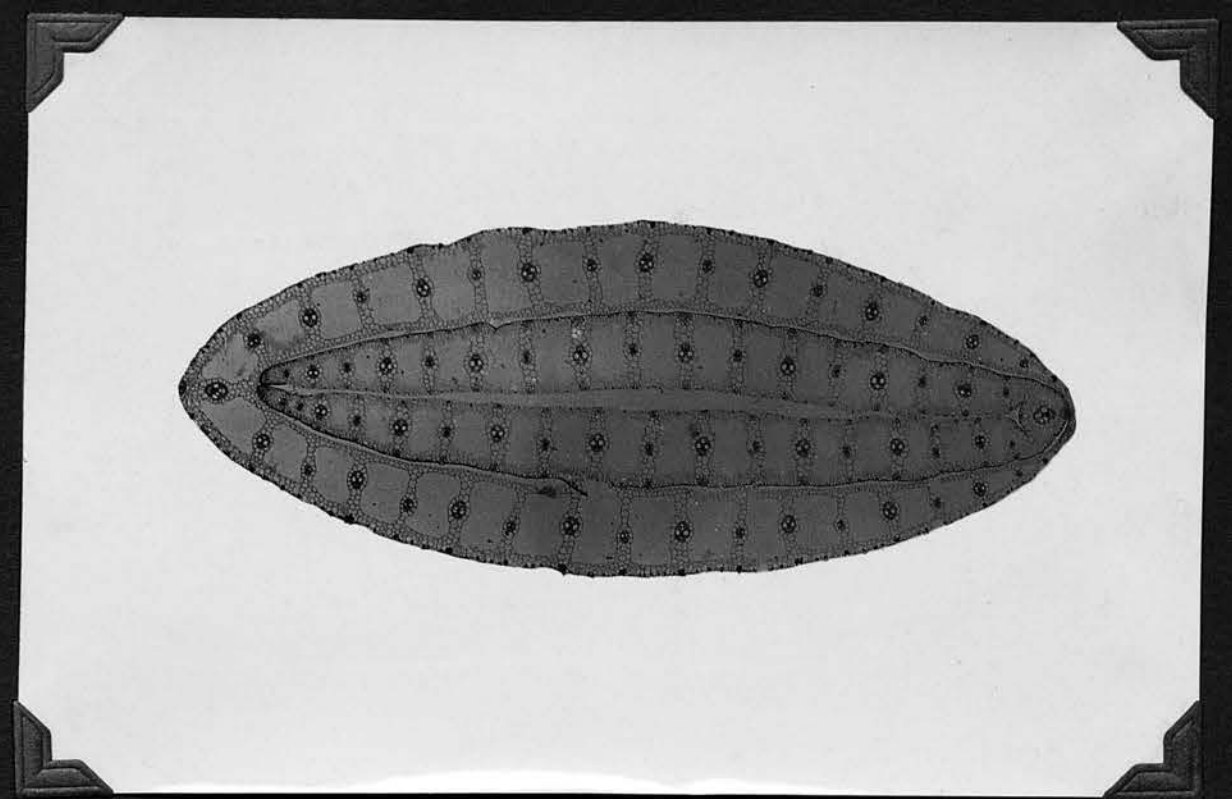


D. Sc., 1935.

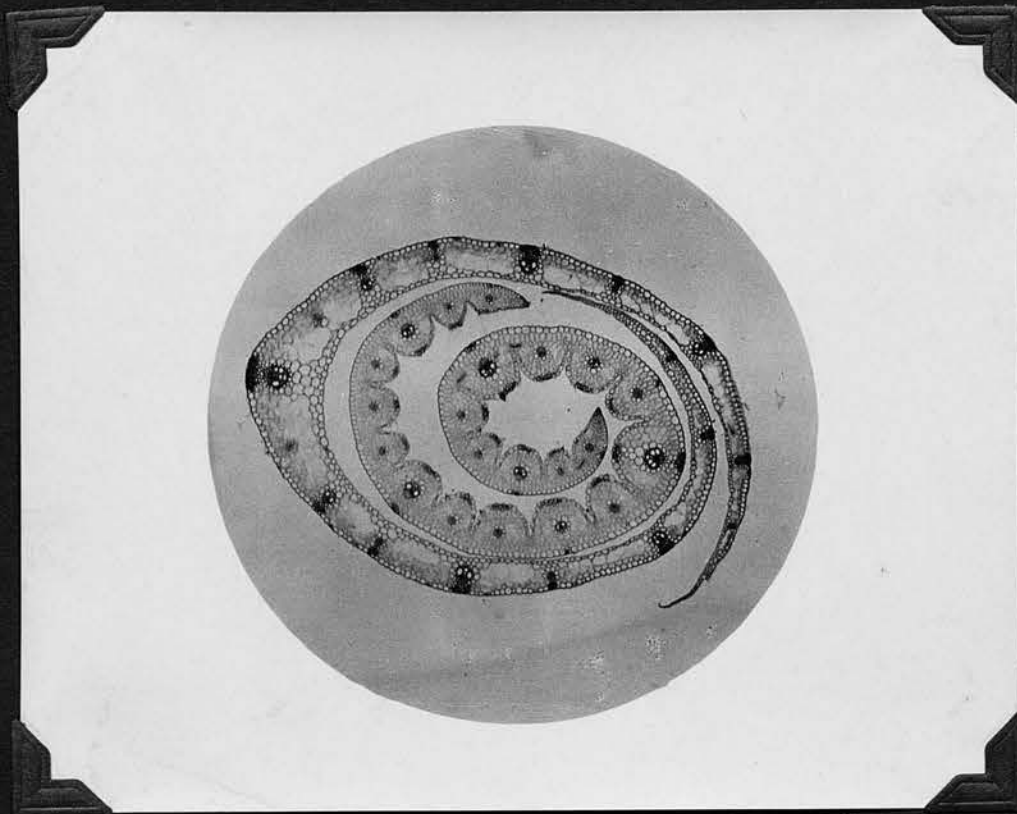
Th. Sect.



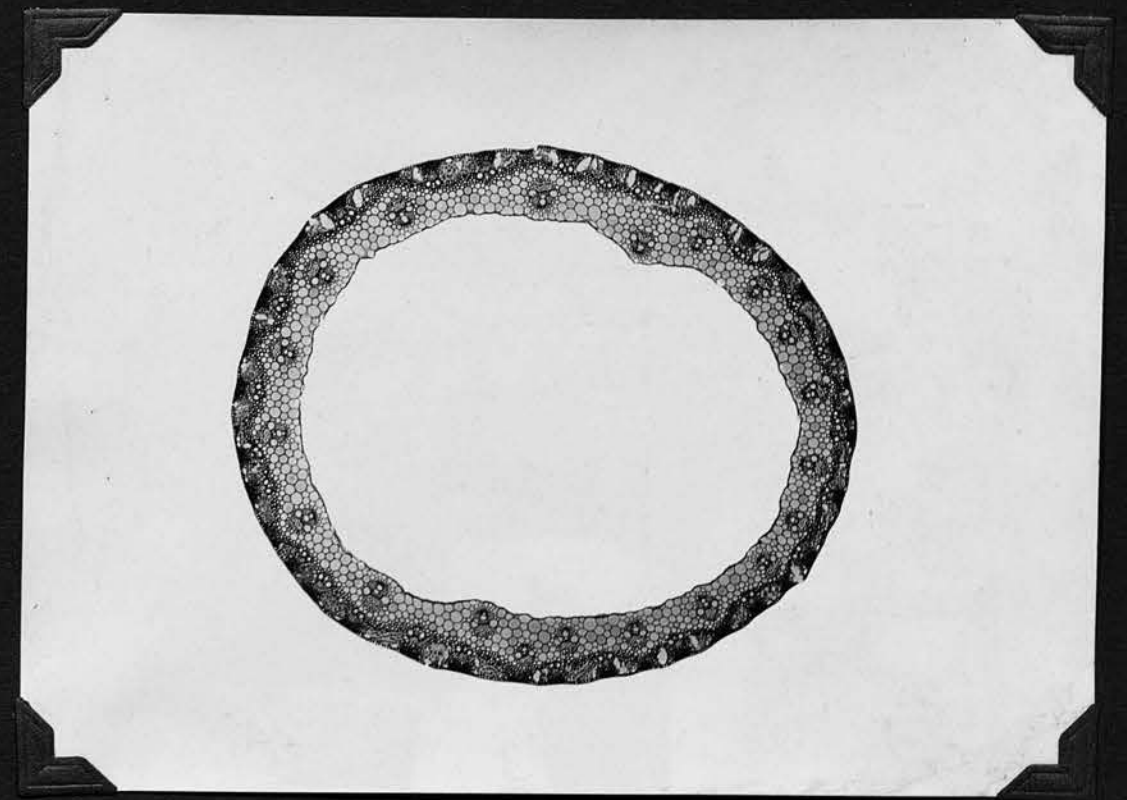
Pl. 1. *Phleum alpinum* L.
(T.S. of vegetative shoot
illustrating convolute ver-
nation and split sheath)
x 40.



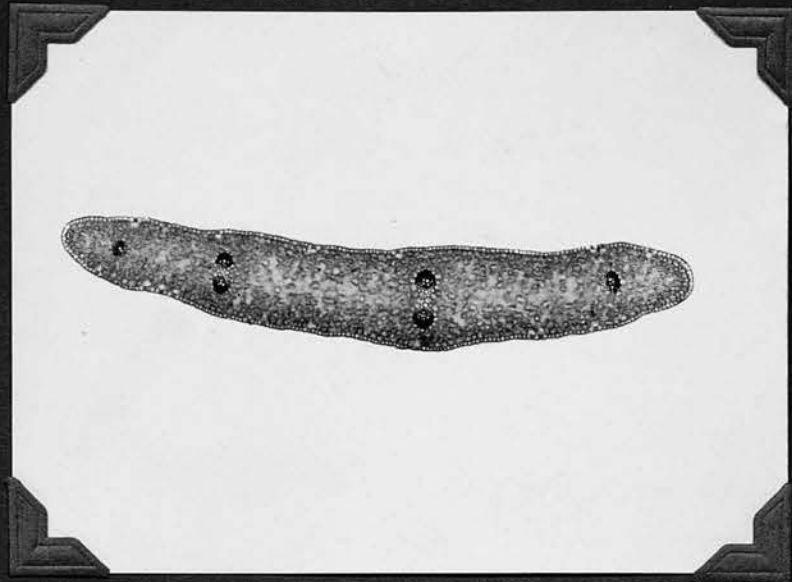
Pl. 2. *Glyceria aquatica* L. (T.S. of vegetative
shoot illustrating conduplicate vernation and
entire sheath) x 20.



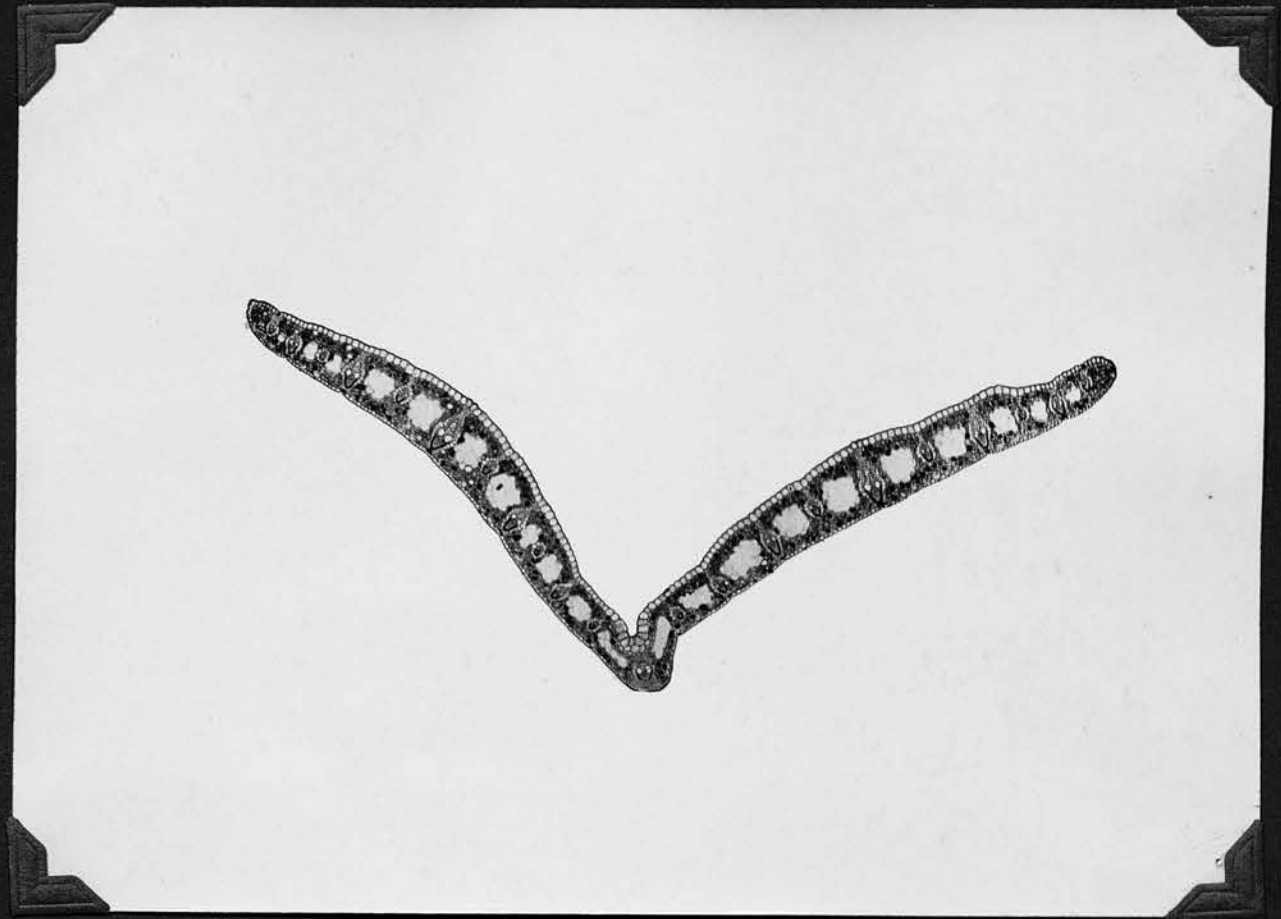
Pl. 3. *Lolium perenne* L. (T.S. of vegetative
shoot showing convolute vernation - usually
described as conduplicate but this is not a
constant character). x 40.



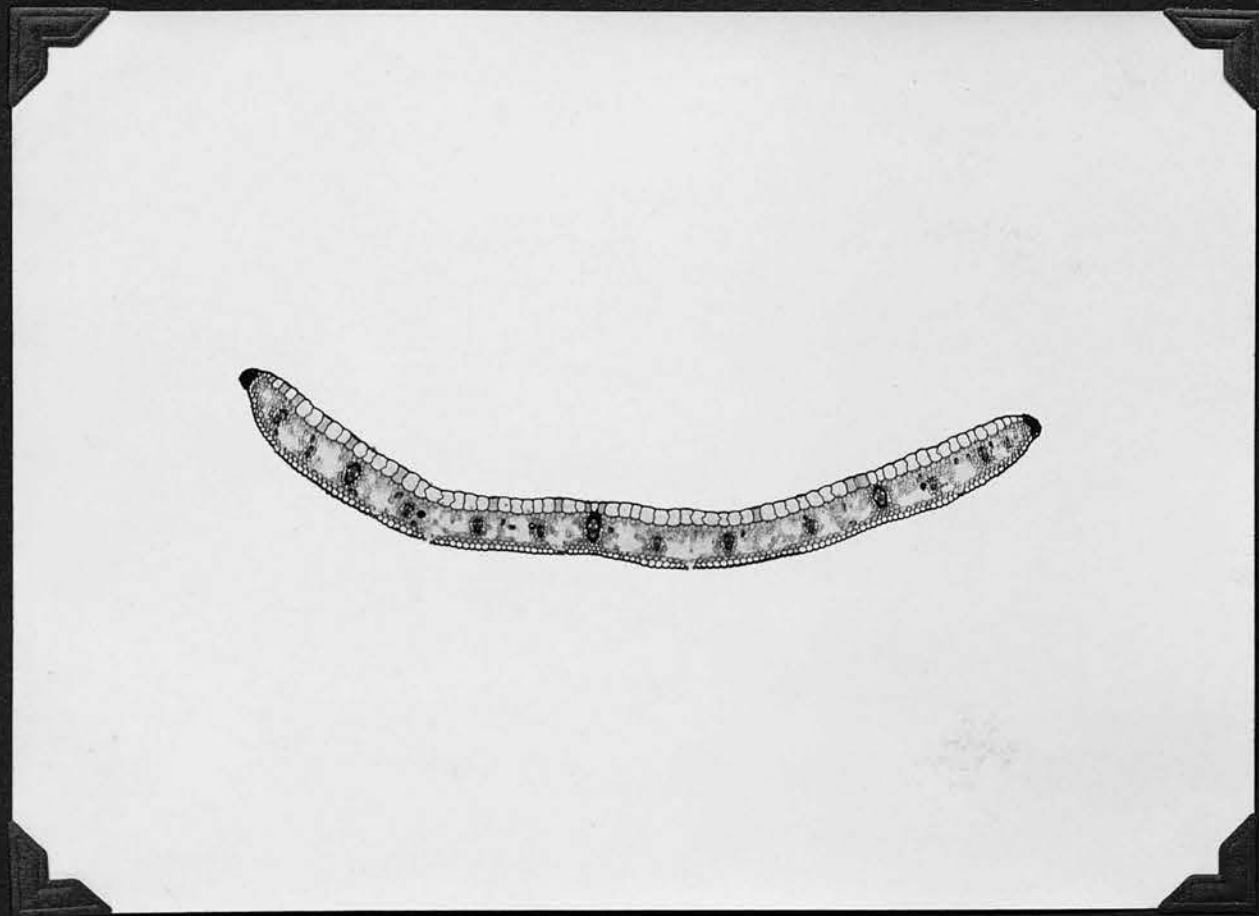
Pl. 4. *Tritium vulgare* Vill. (T.S. flowering
culm; the hollow aerial stem is characteristic
of British grasses, stereome forms a continuous
ring around the periphery.) x 20.



Pl. 5. *Narthecium ossifragum*
Huds. x 40.



Pl. 6. *Carex binervis* Sm. x 35.



Pl. 7. *Luzula multiflora* Lej. x 35.

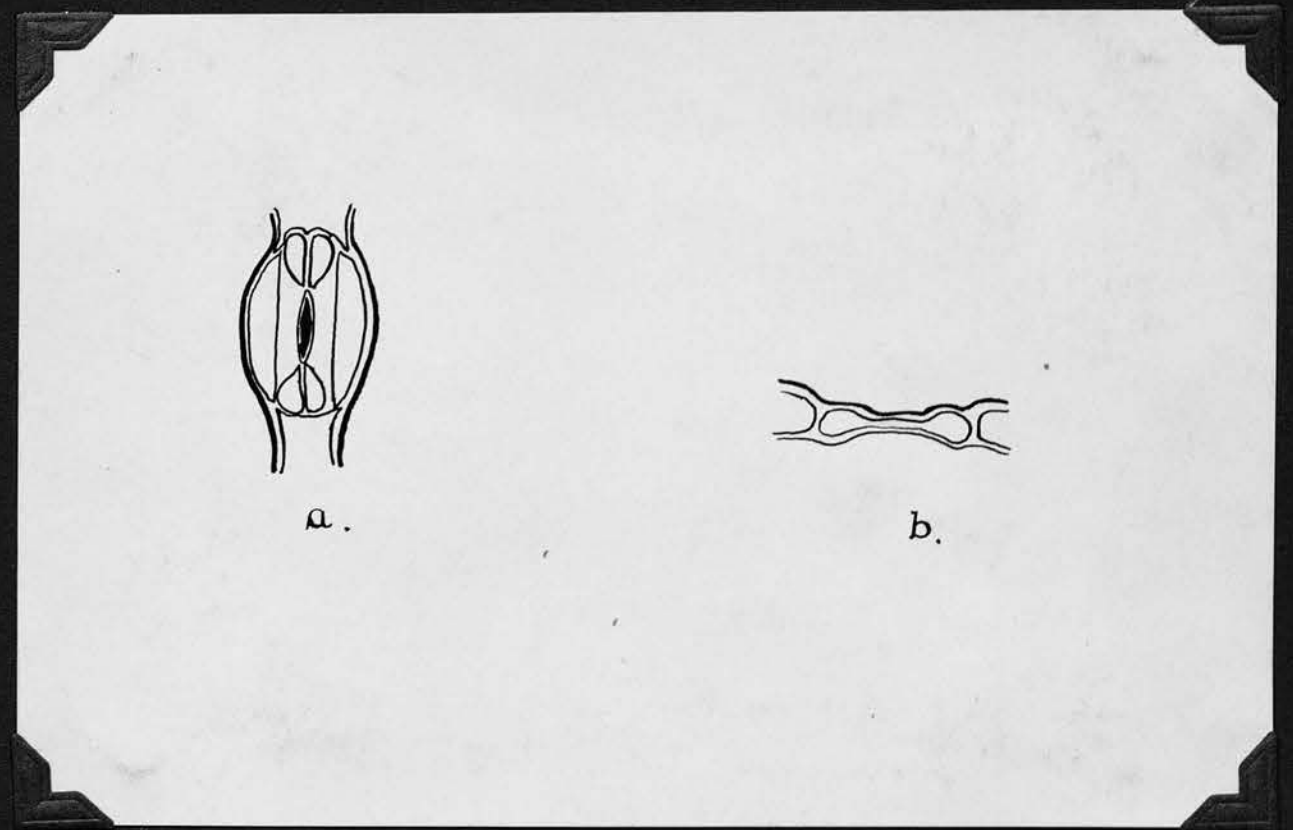
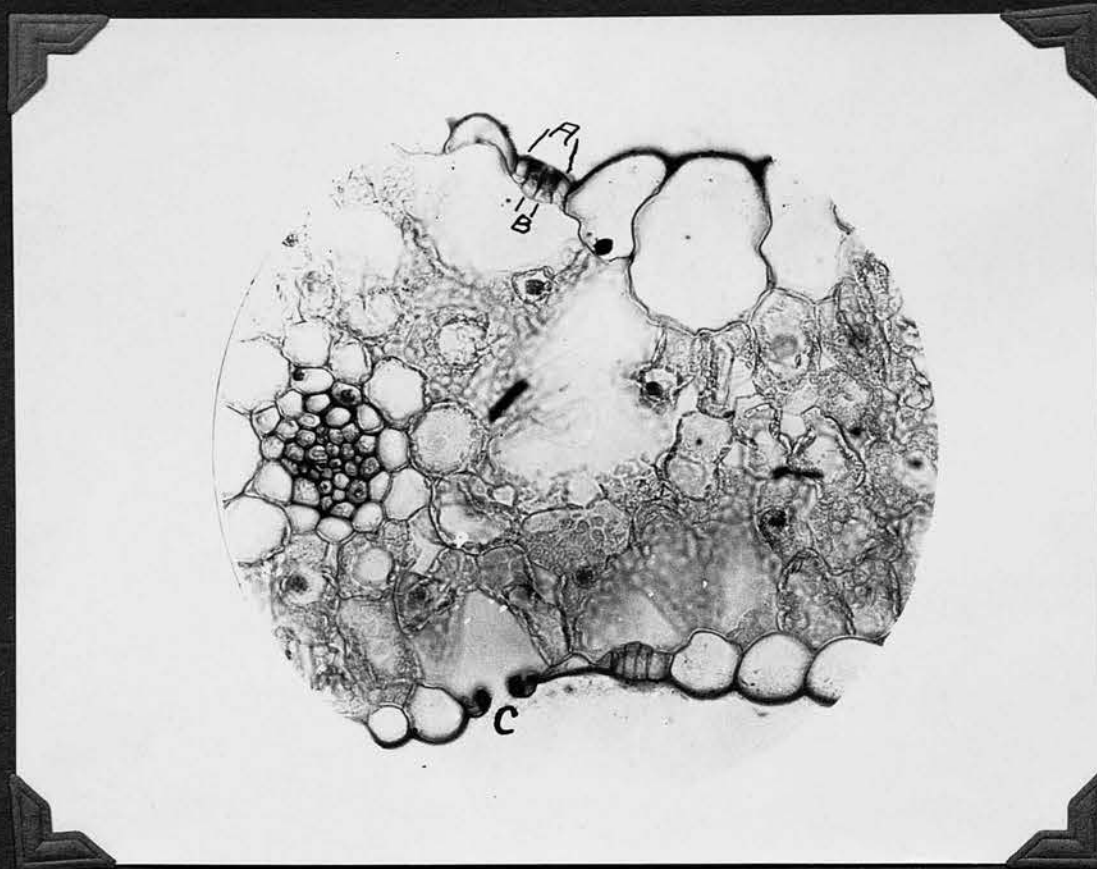
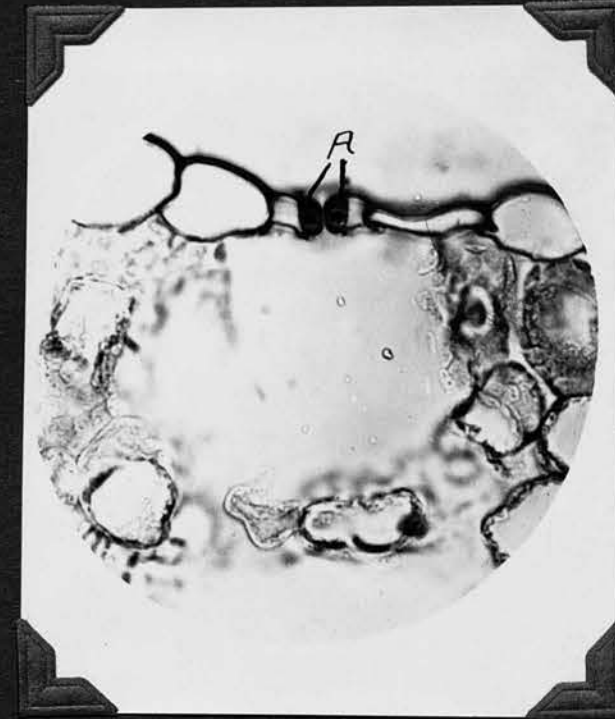


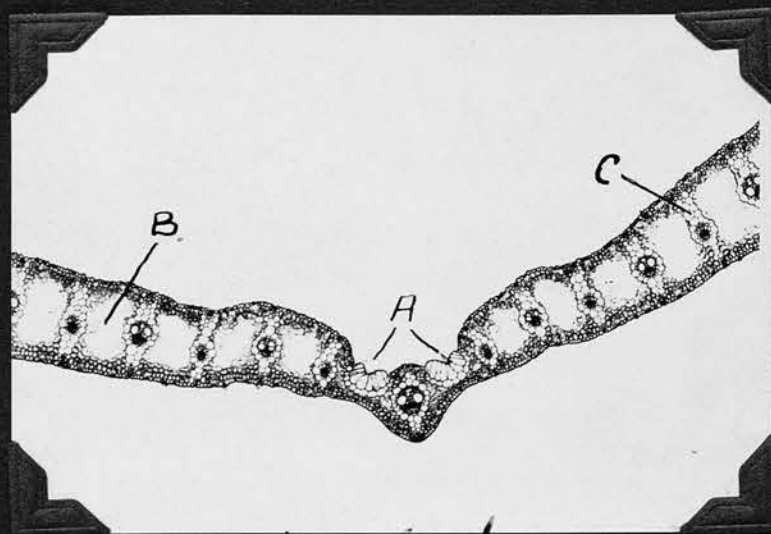
Fig. 8. a. Showing surface view of stoma in leaf
of *Triticum vulgare* Vill. x 400.
(After Percival.)
b. L.S. of guard cell in *Triticum*
vulgare, Vill. x 400.



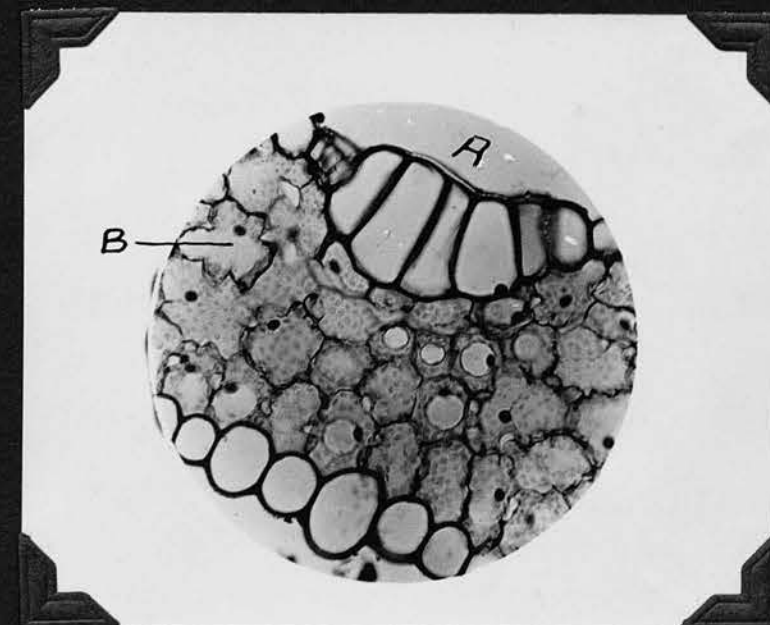
Pl. 9. T.S. of leaf of *Avena fatua* L. showing three stomata - (A) the two ancillary cells; (B) the dilated ends of the two guard cells; (C) stomatal pore. x 250.



Pl.10. T.S. of leaf of *Avena fatua* L. showing stoma in median T.S. where the guard cells (A) have extremely thick walls. x 570.



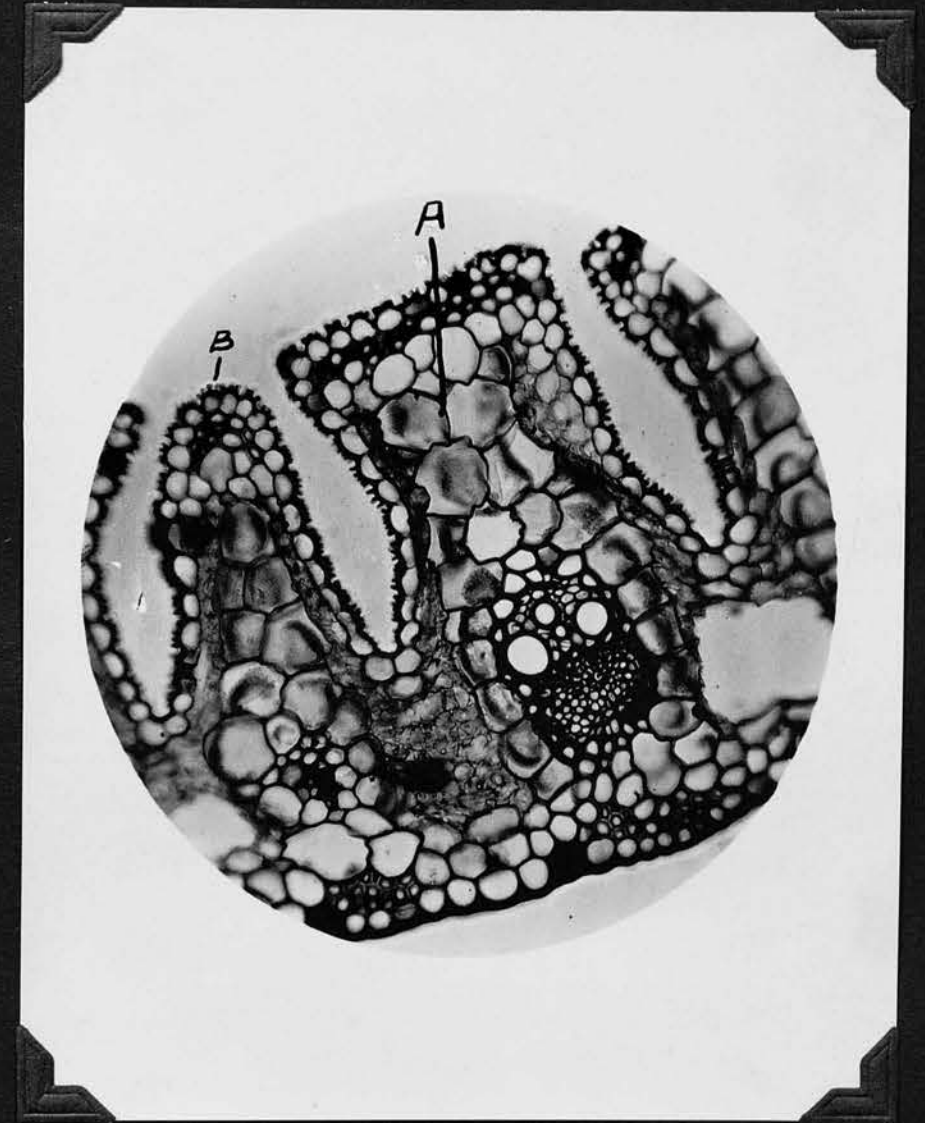
Pl.11. T.S. of leaf of *Glyceria aquatica* Wahl. showing at (A) the two median motor cell groups; (B) a large air chamber; (C) trans-fusion tissue. x 50.



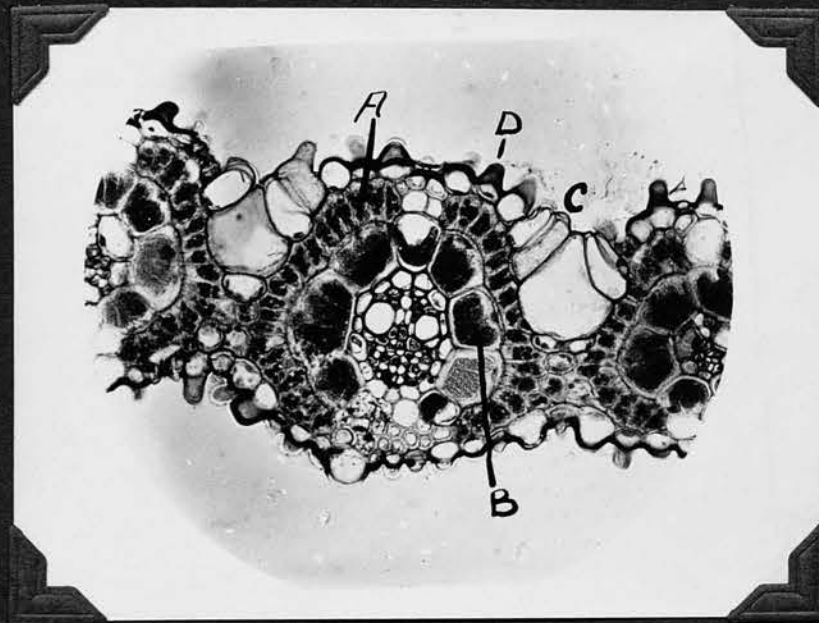
Pl.12. T.S. of leaf of *Bromus ramosus* Huds. showing at (A) motor cells; (B) mesophyll cell with infolded walls, a form found in only a few British grasses. x 250.



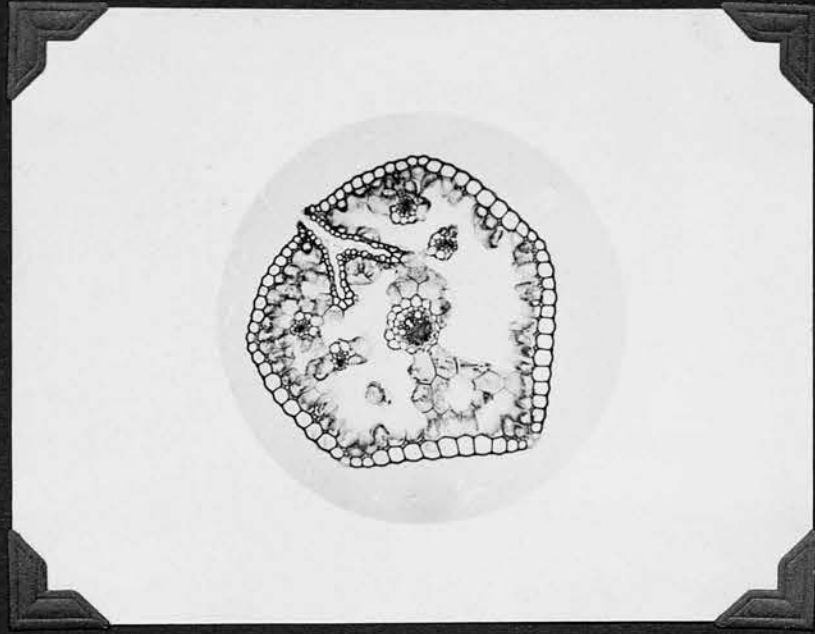
Pl. 13. T.S. of leaf of *Phalaris arundinacea* L., var. *picta* (variegated) showing very uneven distribution of chlorophyll. x 20.



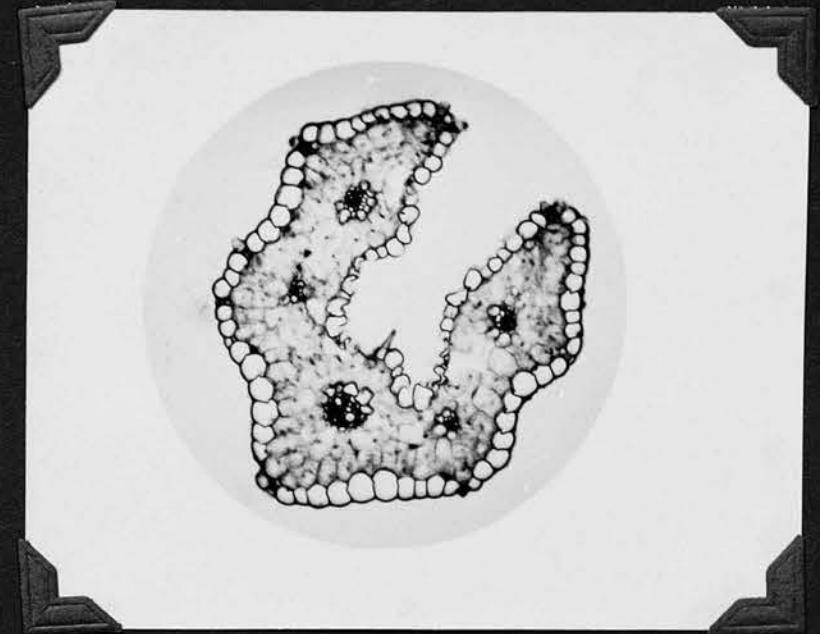
Pl.15. T.S. of leaf of *Spartina Townsendii* Groves showing primary and tertiary bundles; and (A) green parenchymatous sheath; (B) papillae. x 250.



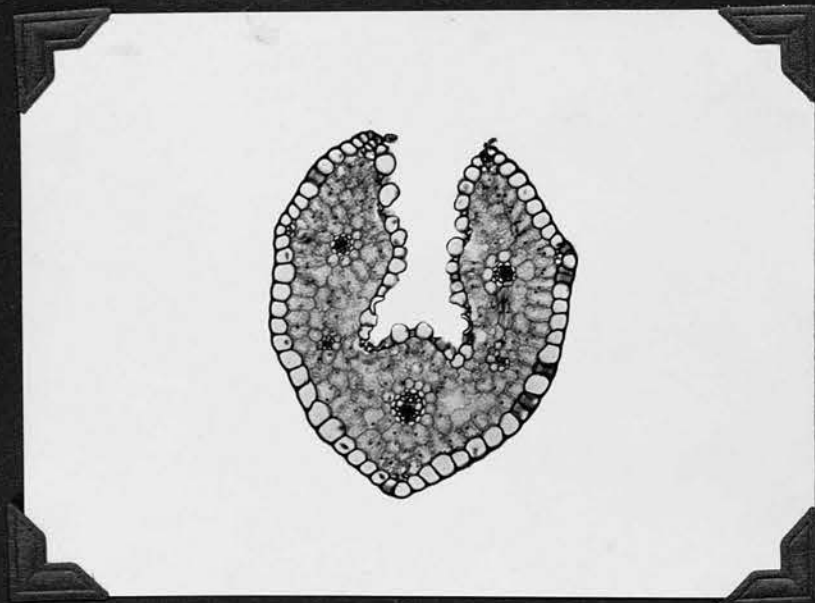
Pl.14. T.S. of leaf of *Cynodon dactylon* Pers. showing at (A) normal chlorophyll in a ring around V.B.; (B) a single cell of the parenchymatous sheath containing chloroplasts; (C) motor cells; (D) papilla. x 350.



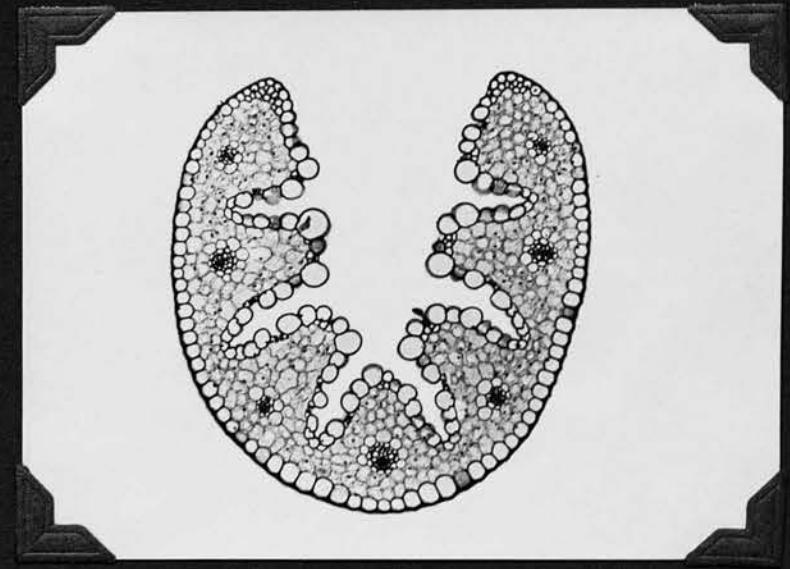
Pl. 18. *Deschampsia flexuosa* Trin. x 100.



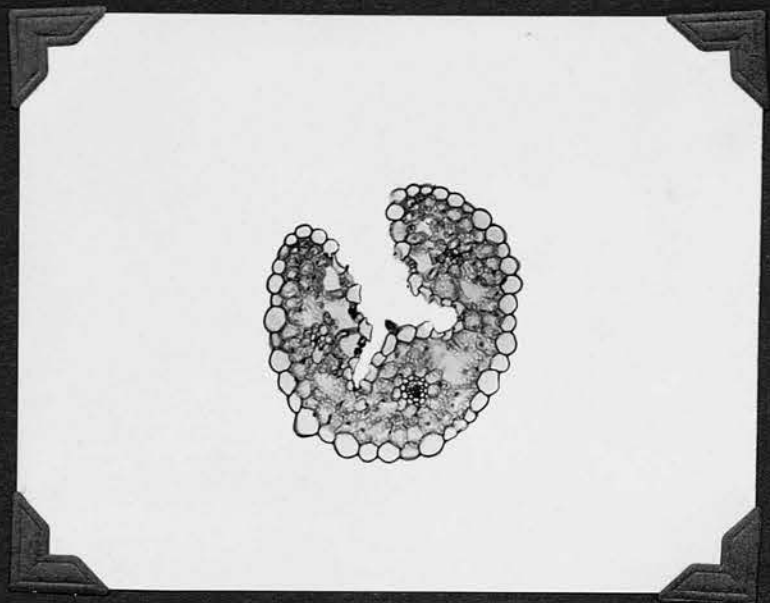
Pl. 19. *Aira caryophyllea* L. x 100.



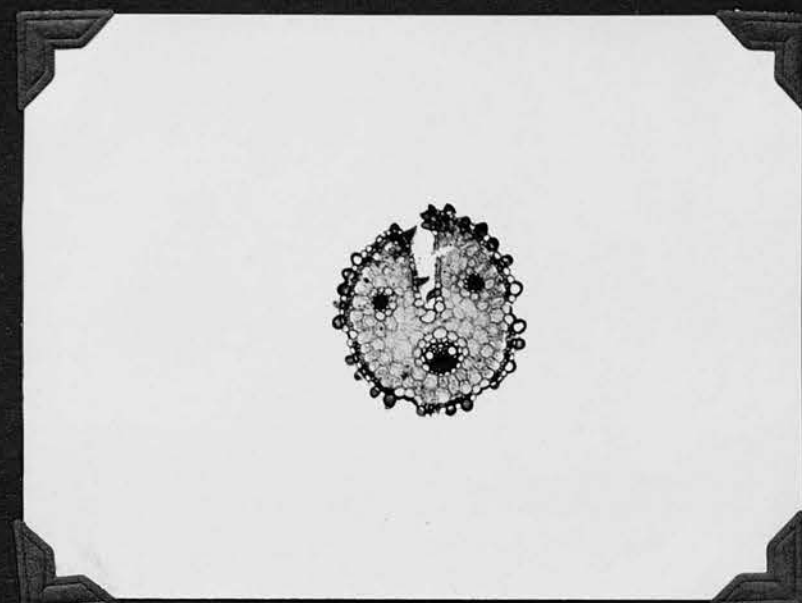
Pl. 20a. *Aira praecox* L. (basal leaf)
x 100.



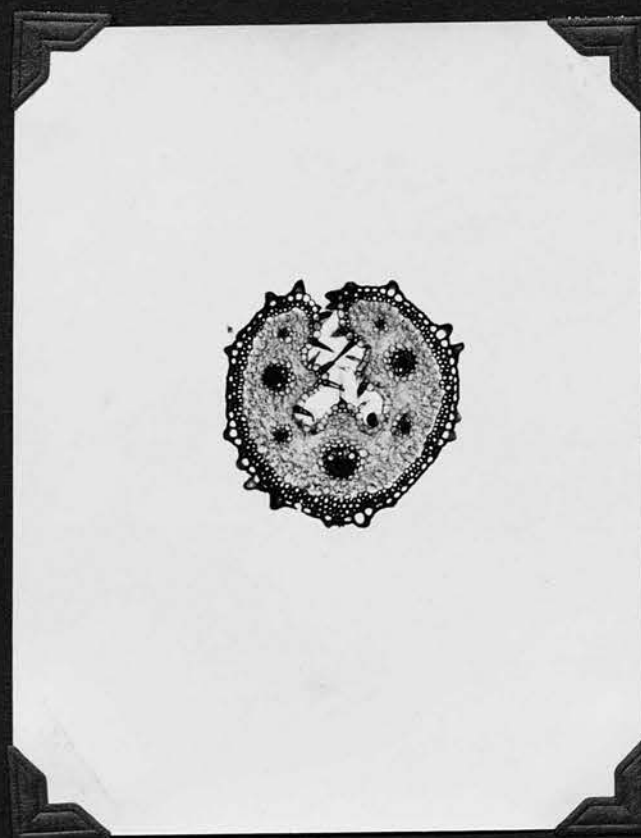
Pl. 20b. *Aira praecox* L. (top culm
leaf) x 100.



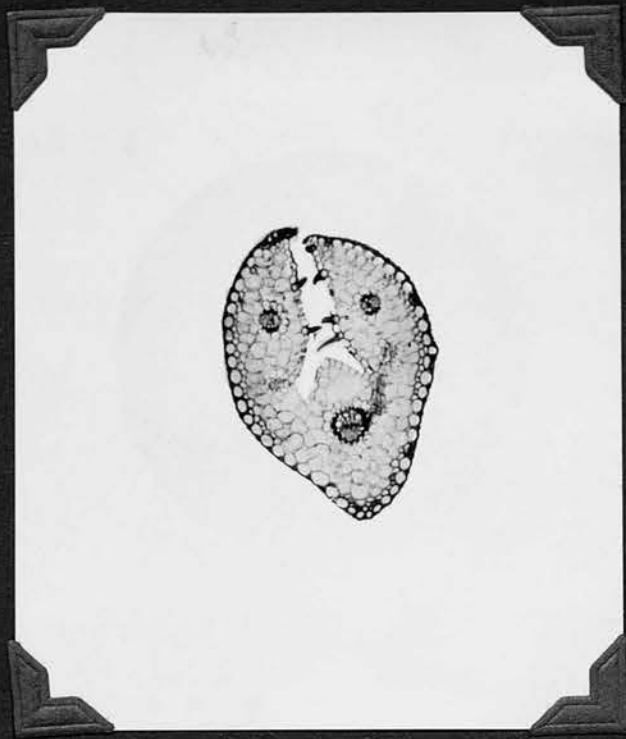
Pl. 21. *Mibora minima* Desv. x 100.



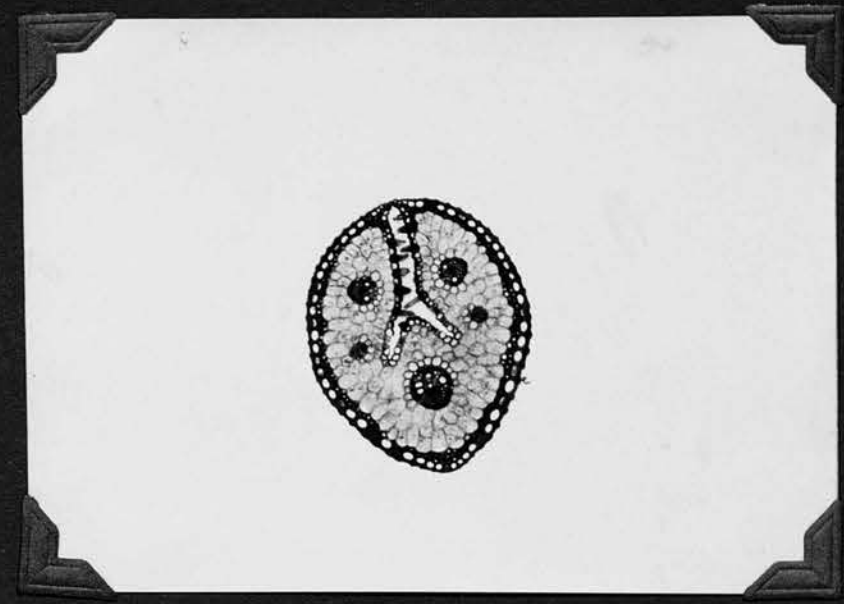
Pl. 22. *Agrostis setacea* Curt. x 100.



Pl. 23. *Corynephorus canescens* Beauv.
x 100.



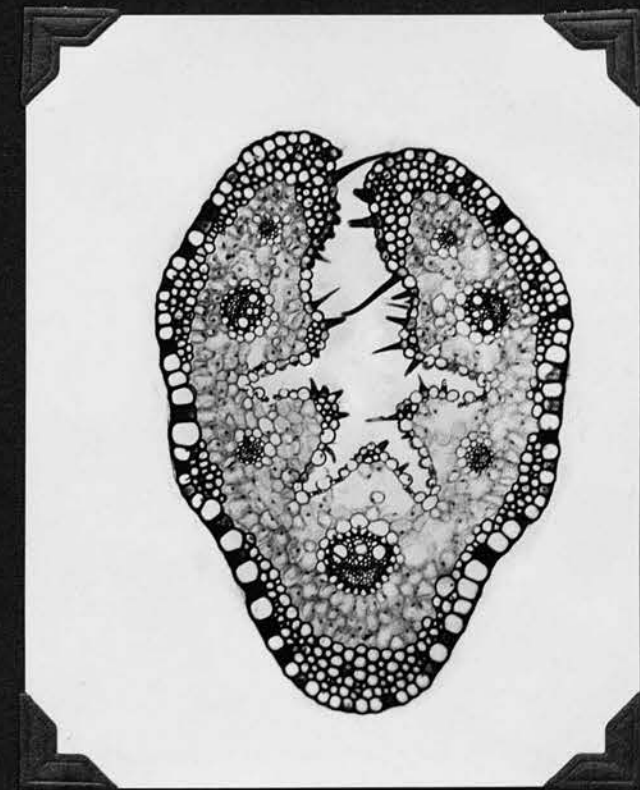
Pl. 24. *Festuca ovina* L. x 100.



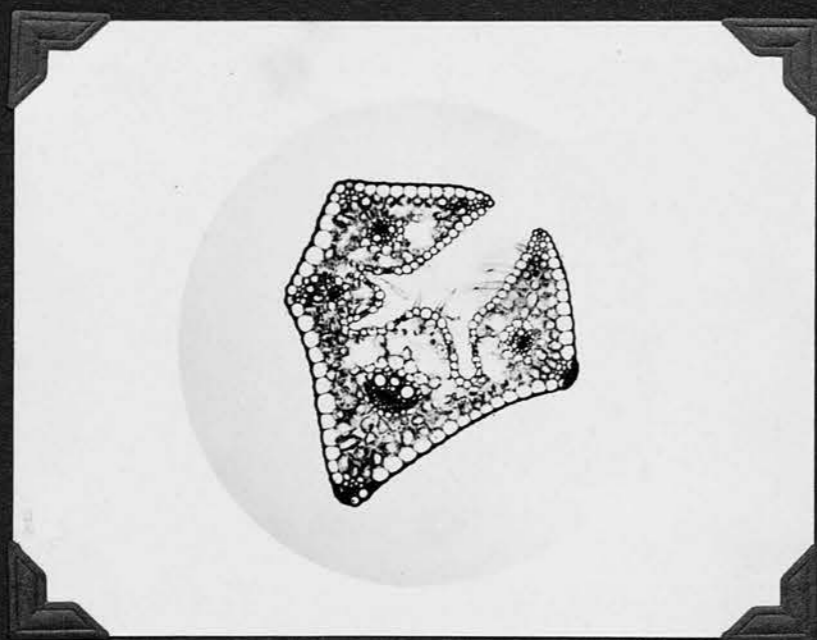
Pl. 25. *Festuca capillata* Lam. x 100.



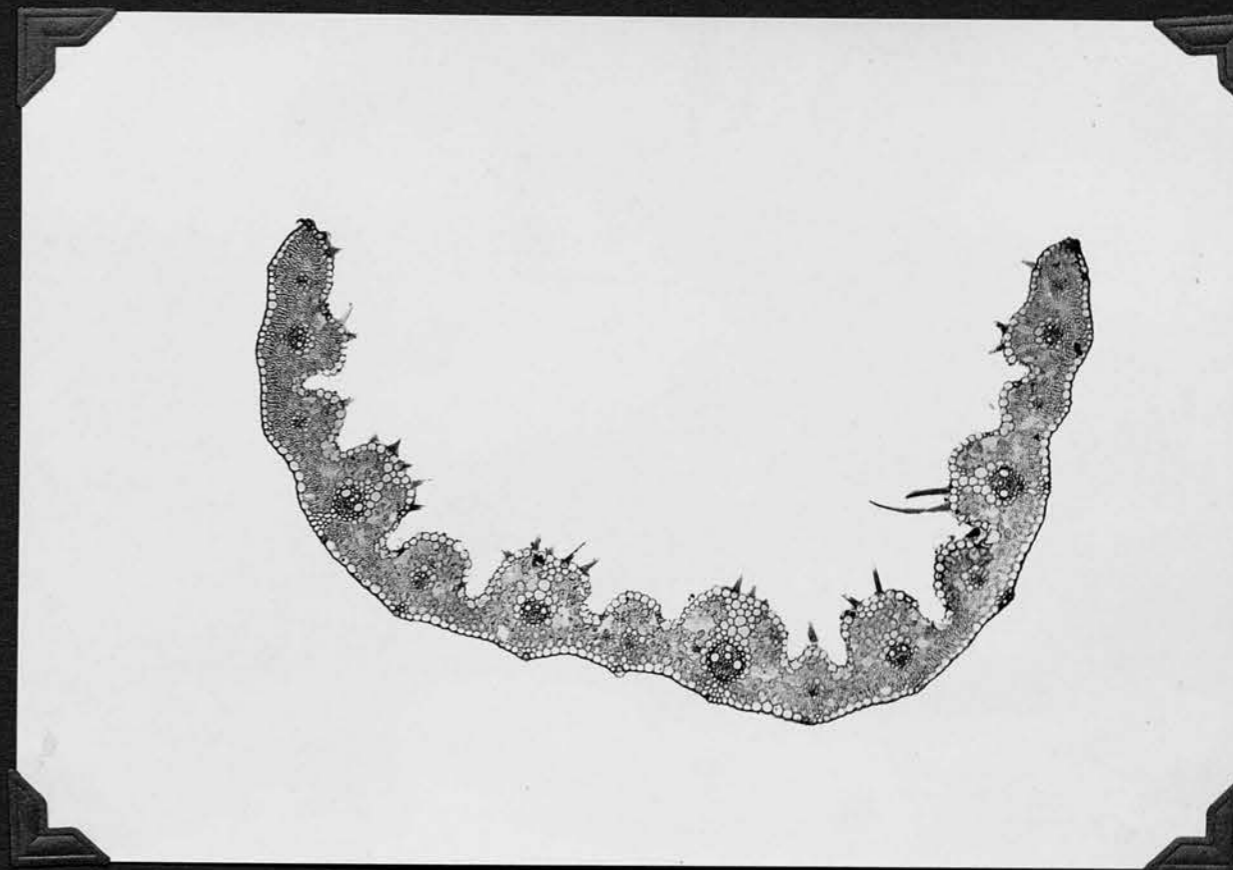
Pl. 26. *Festuca juncifolia* St. Am.
x 100.



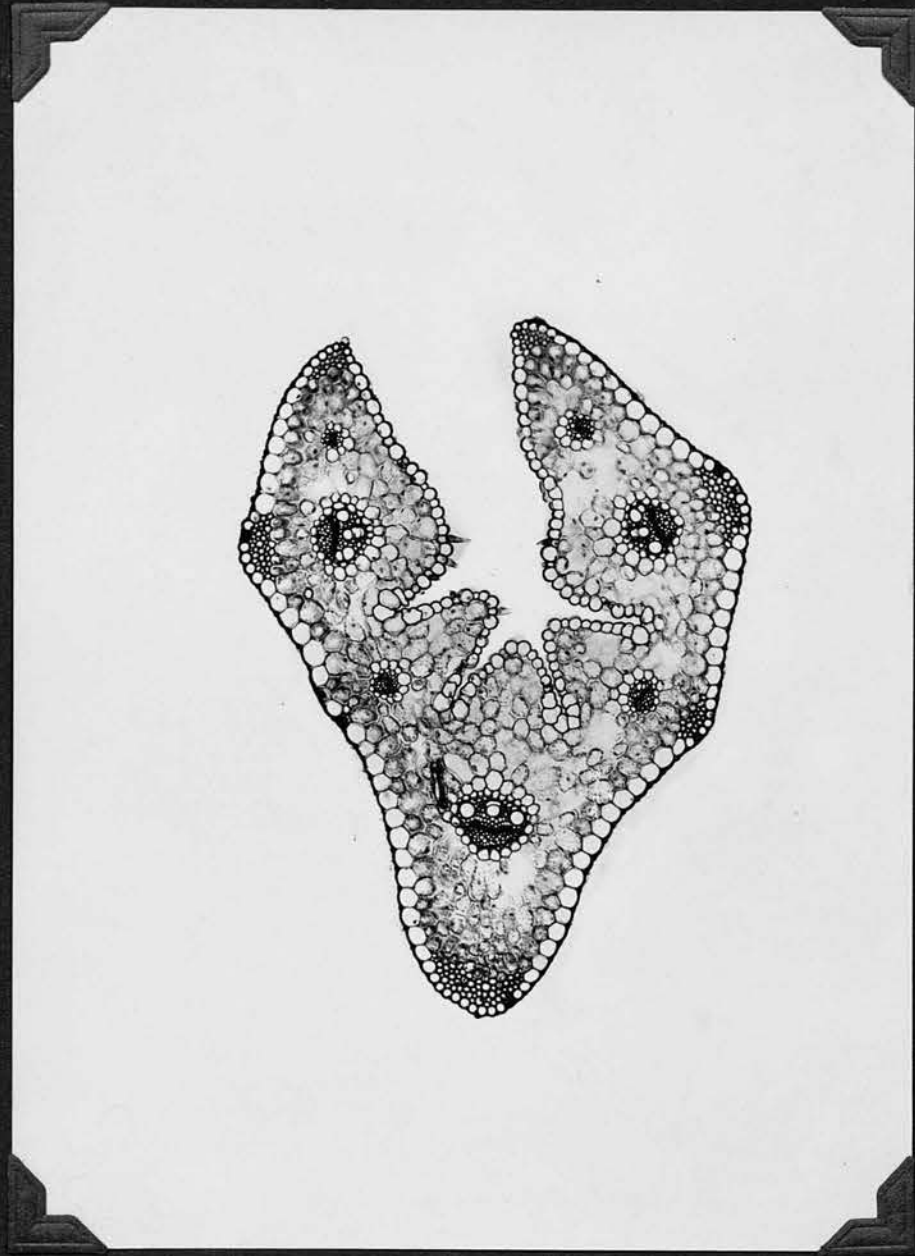
Pl. 27. *Festuca oraria* Dum. et Bab. x 80.



Pl. 28a. *Festuca heterophylla* Lam.
(basal leaf) x 100.



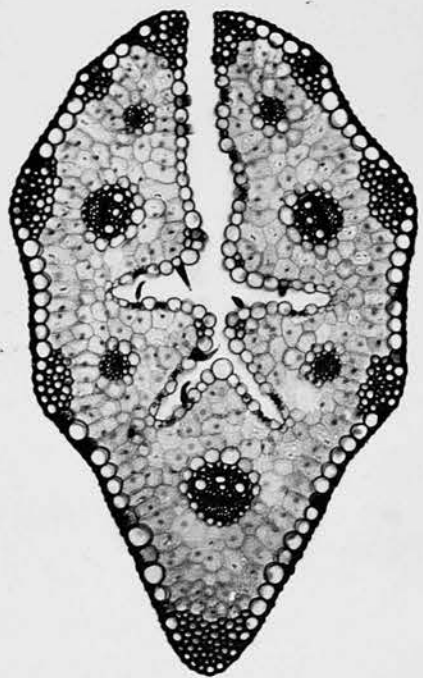
Pl. 28b. *Festuca heterophylla* Lam. (top culm leaf) x 50.



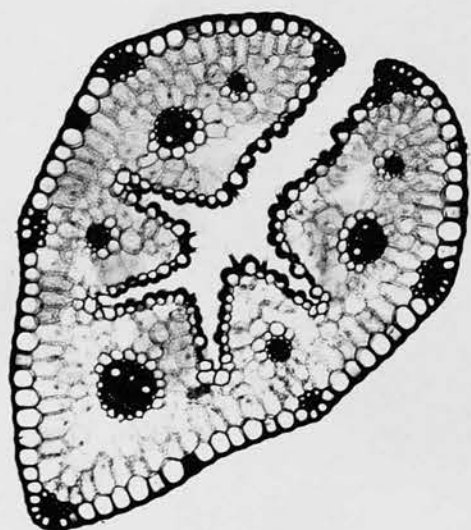
Pl. 29a. *Festuca rubra* sub-sp. *fallax* Thuill
x 100.



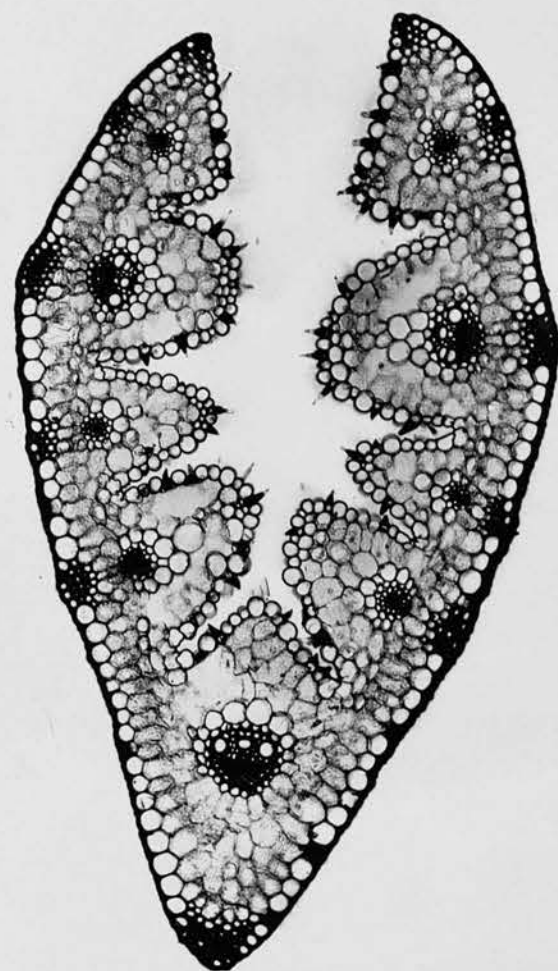
Pl. 29b. *Festuca rubra* sub-sp. *fallax* Thuill
x 100.



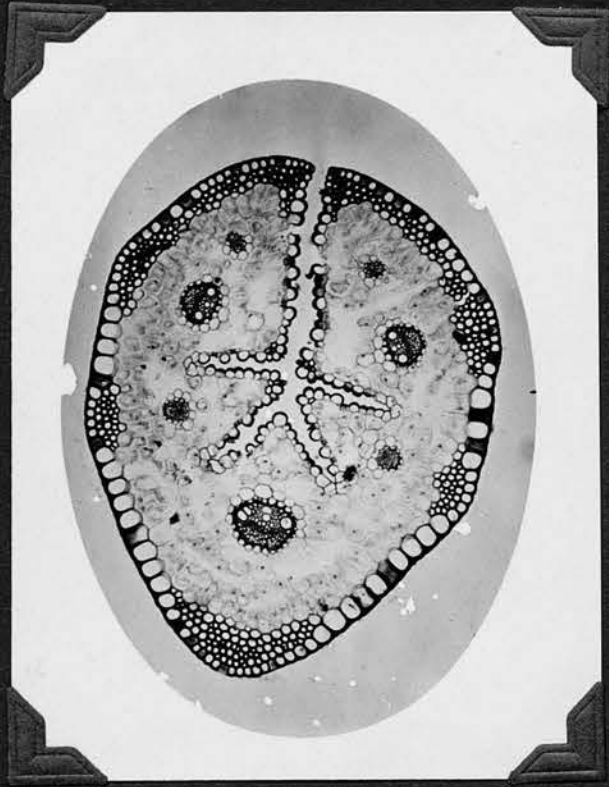
Pl. 29c. *Festuca rubra* sub-sp. genuina, var. vulgaris
Gaud. x 100.



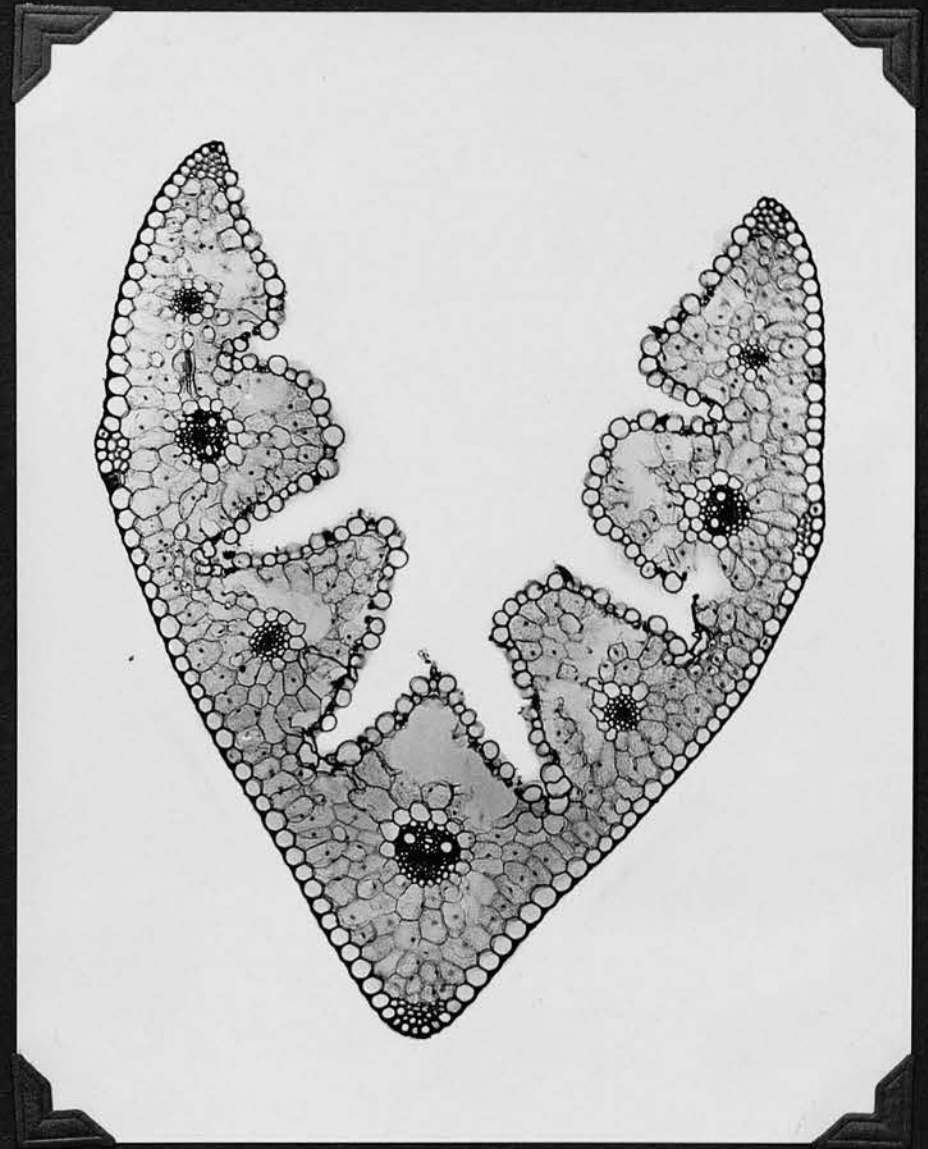
Pl. 29e. *Festuca rubra* sub-sp. genuina, var. glaucescens
Hegets et Heer x 100.



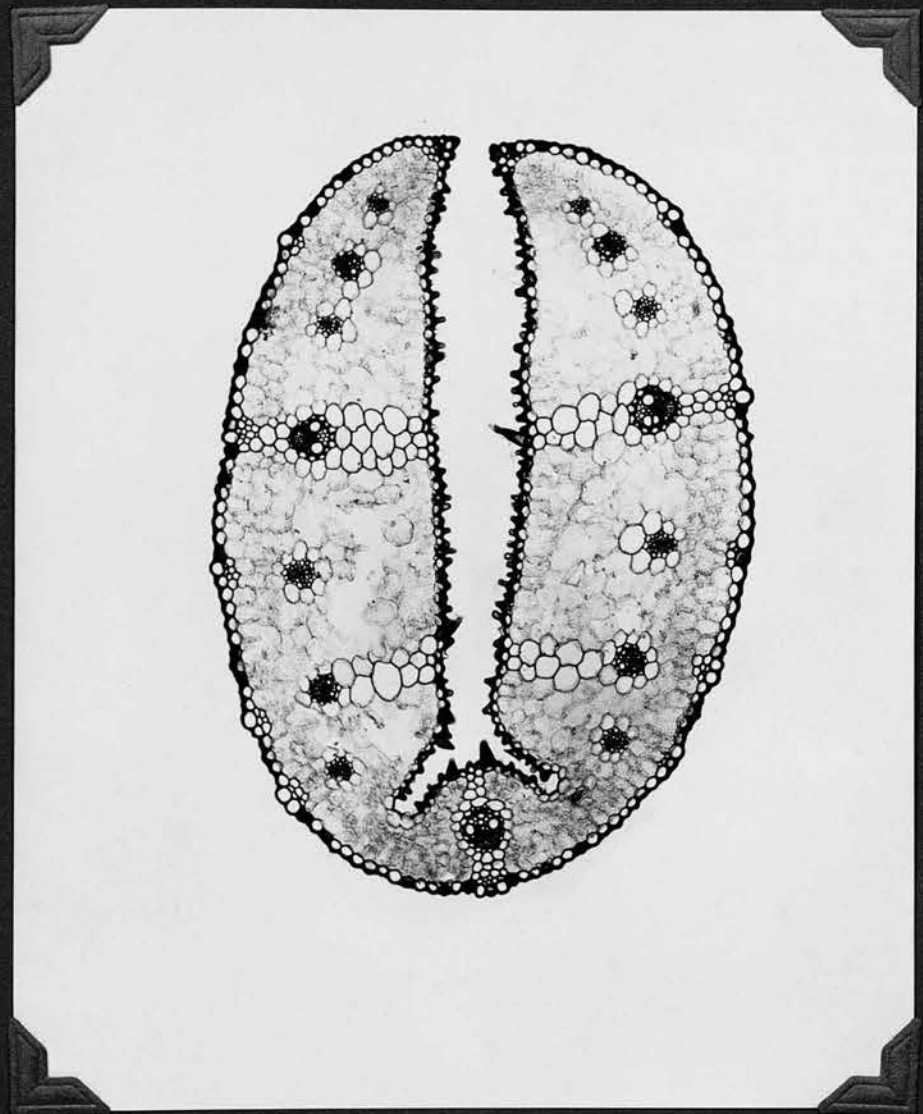
Pl. 29d. *Festuca rubra* sub-sp. genuina, var.
grandiflora Hack x 100.



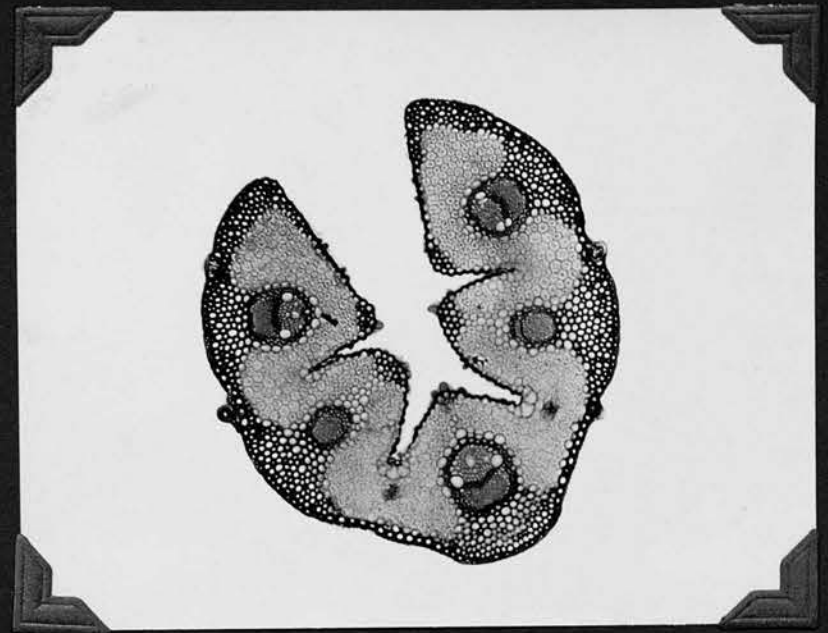
Pl.29f. *Festuca rubra* sub-sp.
genuina, var. pruinosa Hack.
x 80.



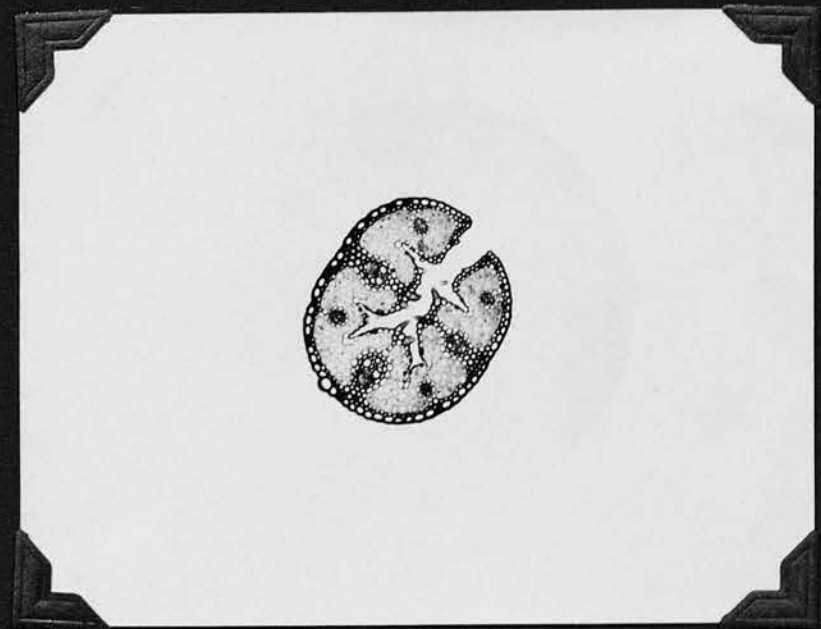
Pl. 29g. *Festuca rubra* sub-sp. genuina, var.
arenaria Osb. x 100.



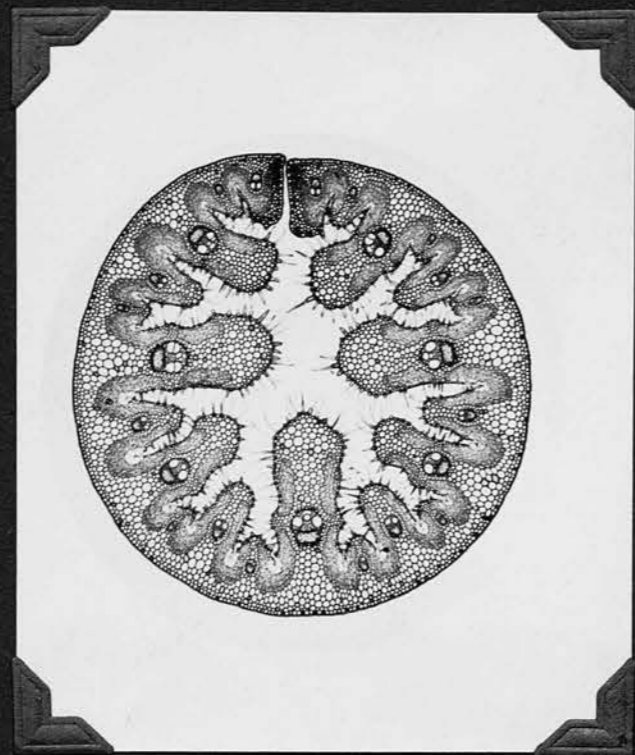
Pl. 30. *Glyceria maritima* Wahl. x 80.



Pl. 31. *Nardus stricta* L. x 100.



Pl. 32. *Stipa pennata* L. x 100.



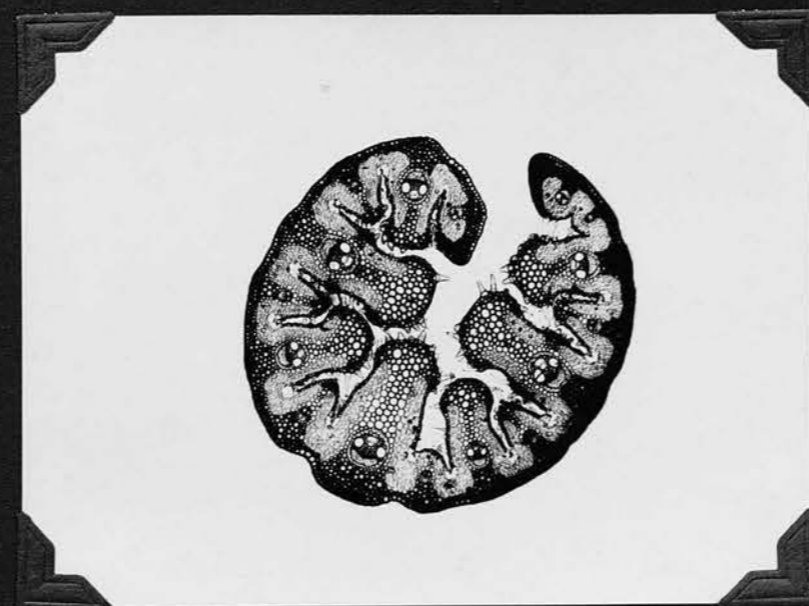
Pl. 33a. *Ammophila arenaria* Link. (normal habitat) x 35.



Pl. 33b. *Ammophila arenaria* Link. (on loam) x 35.



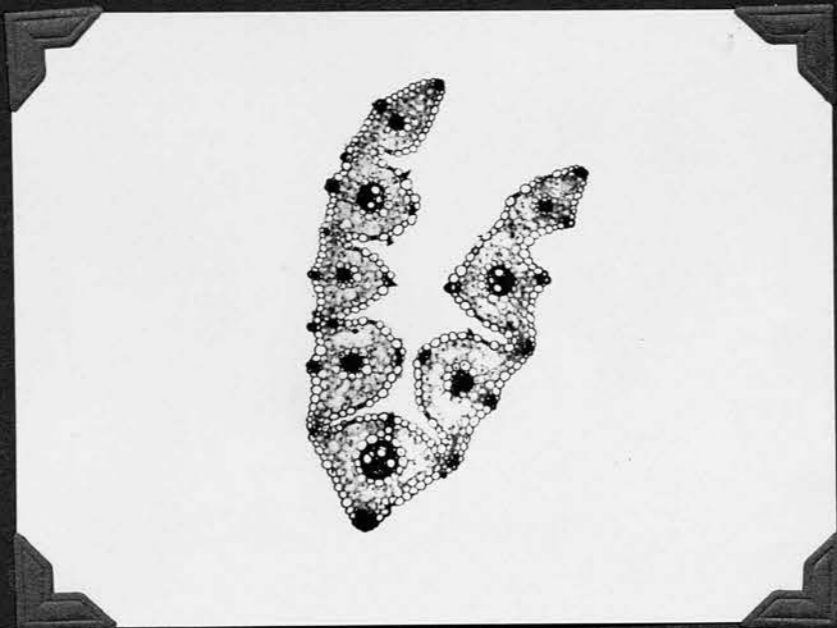
Pl. 34a. *Ammophila baltica* Link. (normal habitat) x 35.



Pl. 34b. *Ammophila baltica* Link. (exhibiting keel - normal habitat) x 35.



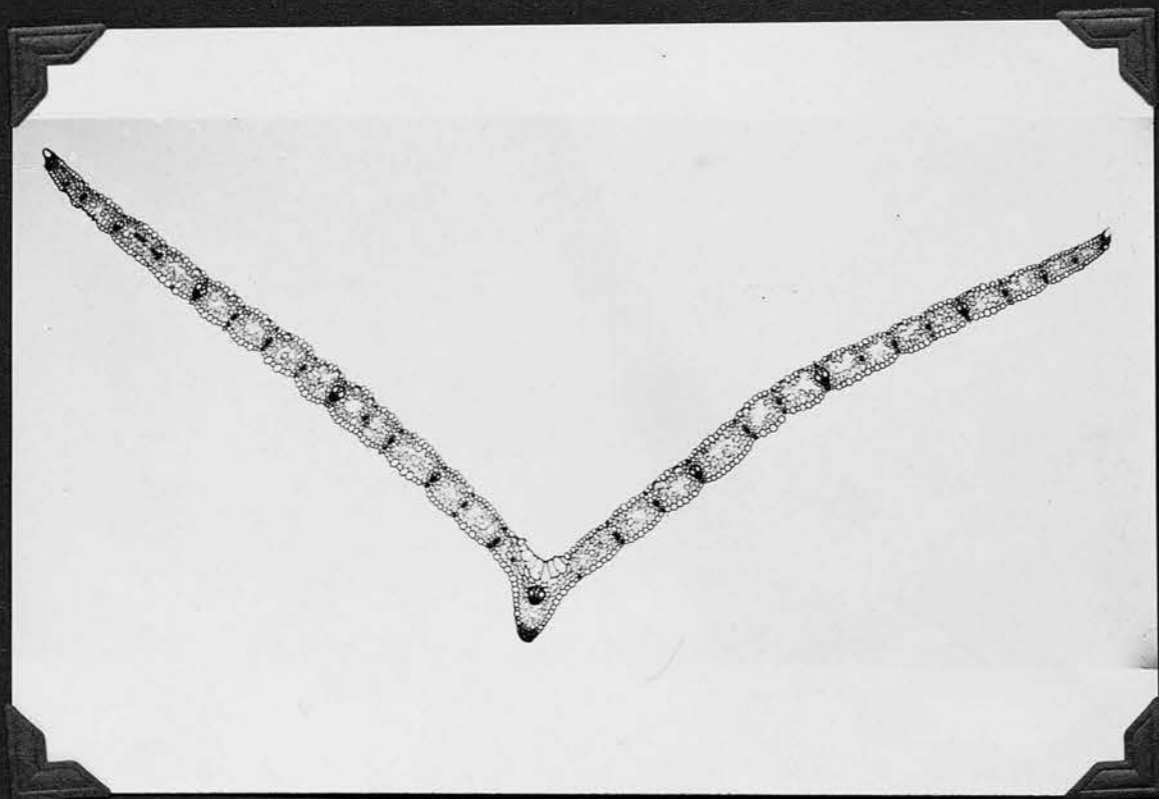
Pl. 34c. *Ammophila baltica* Link. (on loam) x 35.



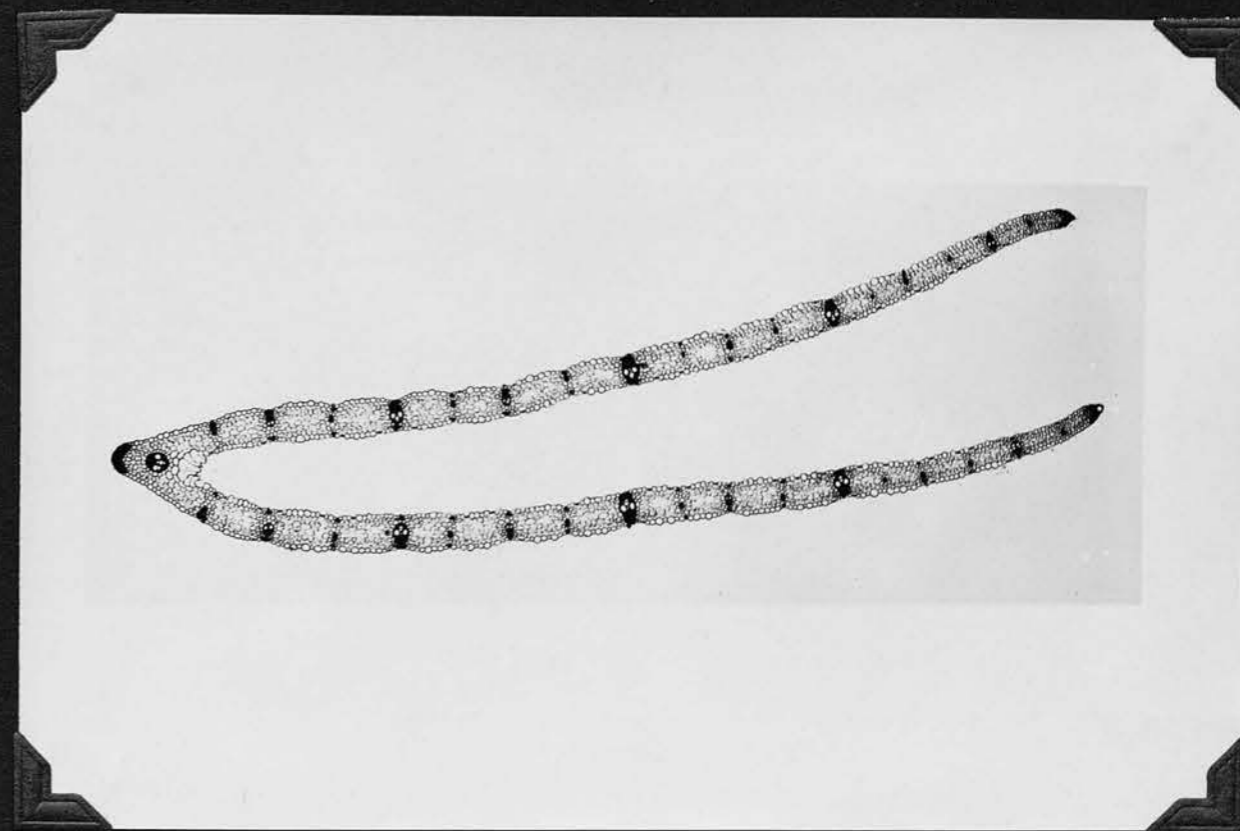
Pl. 35a. *Agrostis canina* L. (conduplicate vernation) x 100.



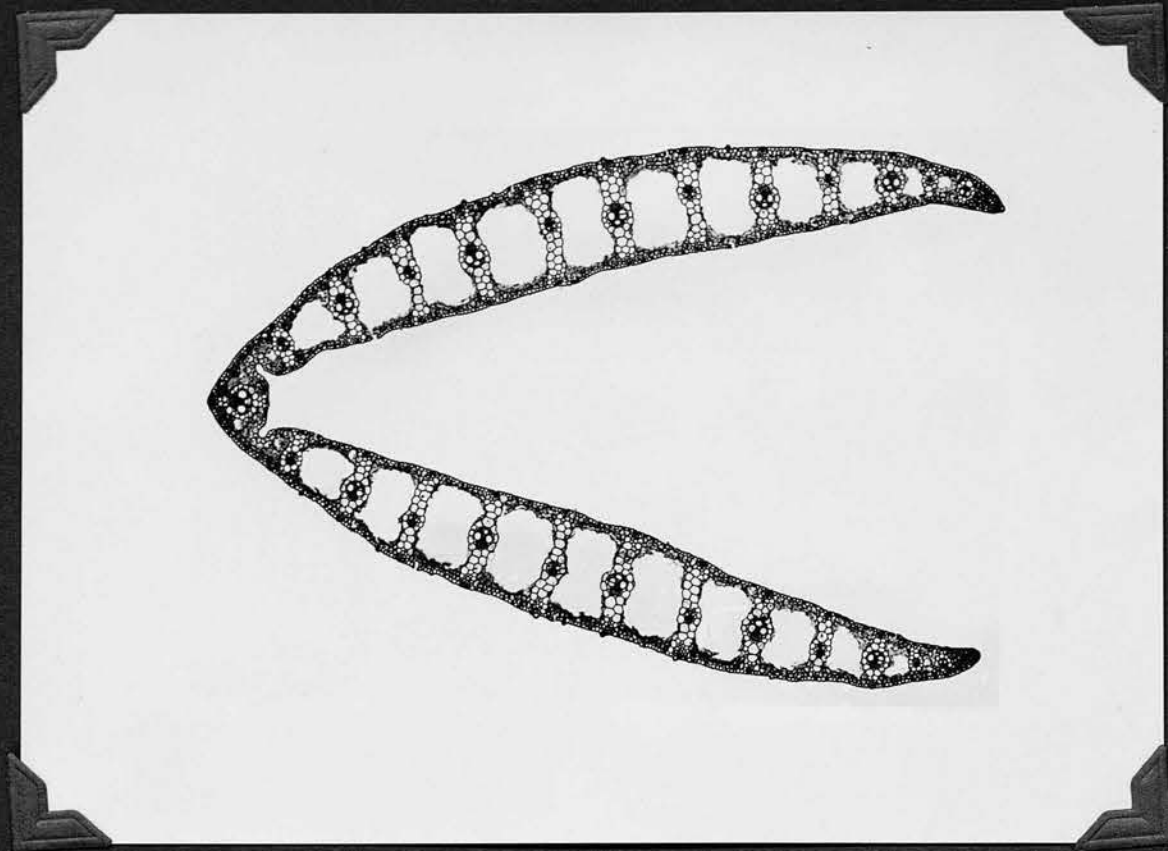
Pl. 35b. *Agrostis canina* L. (convolute vernation) x 100.



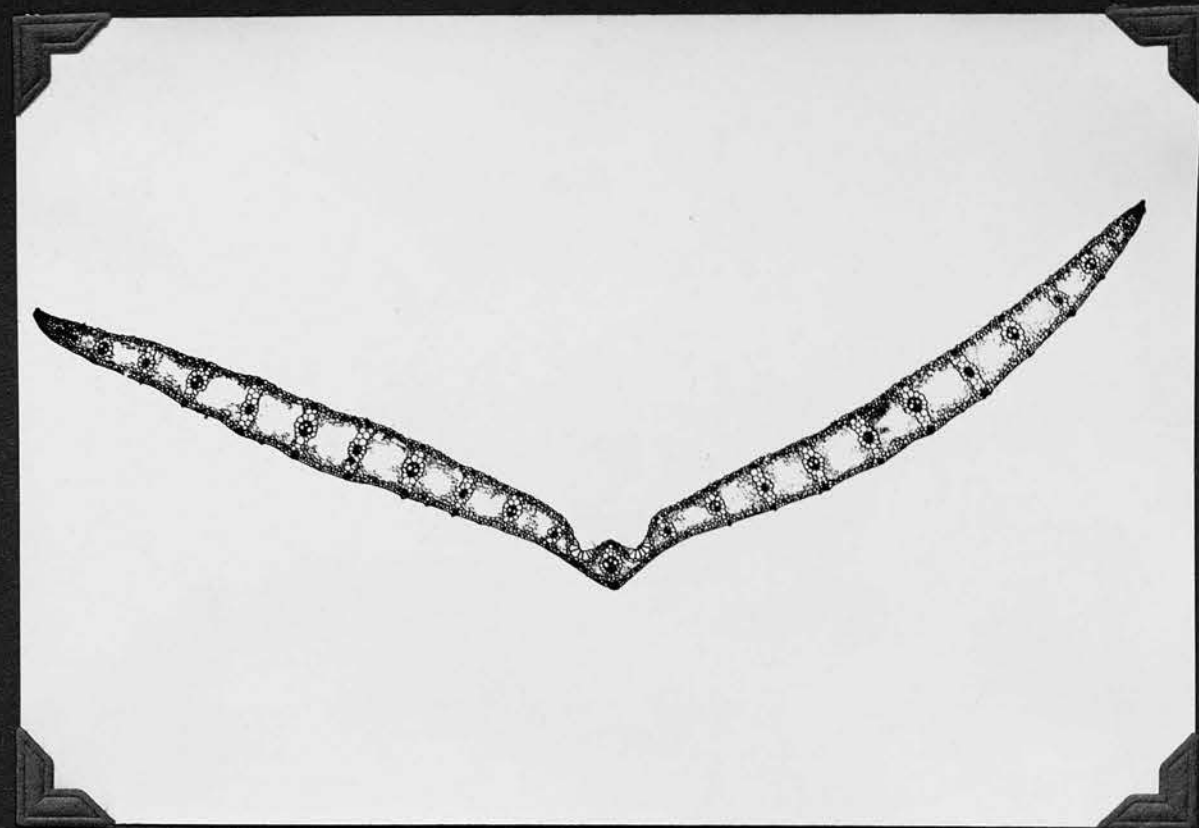
Pl. 36. *Dactylis glomerata* L. x 35.



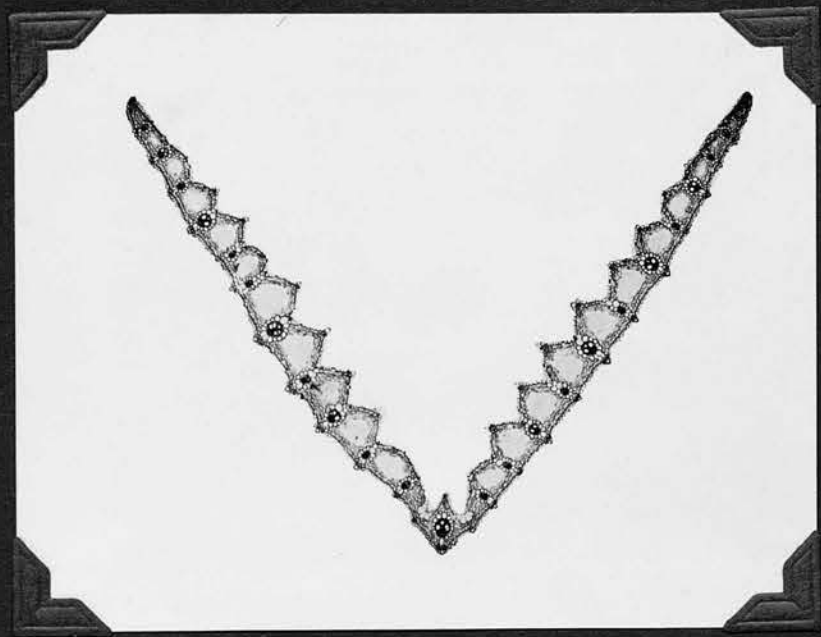
Pl. 37. *Dactylis aschersoniana* x 35.



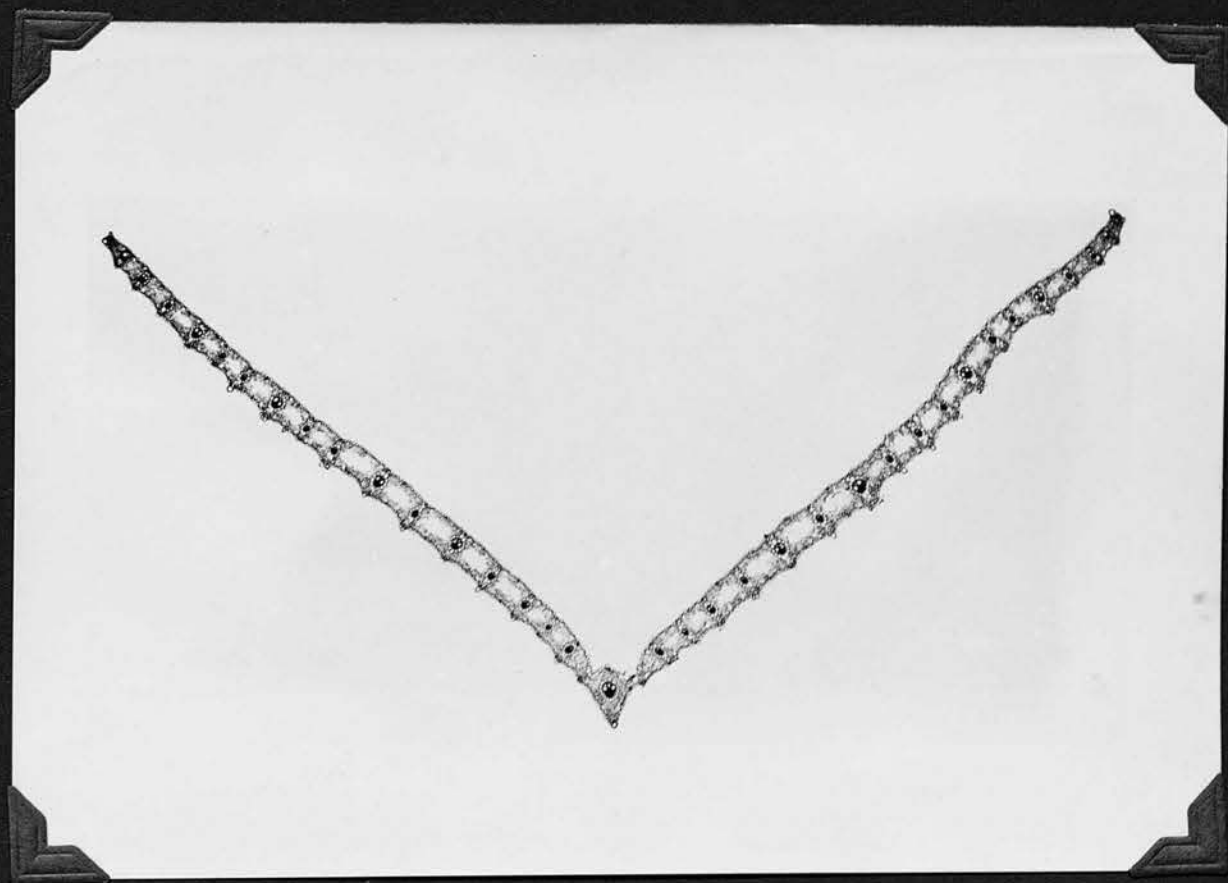
Pl. 38a. *Glyceria aquatica* Wahl. x 30.



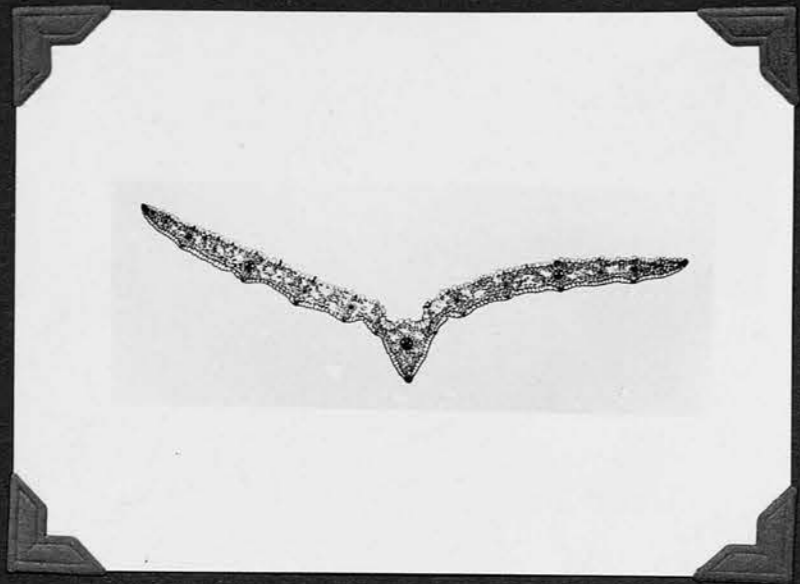
Pl. 38b. *Glyceria aquatica* Wahl. (showing a few stellate cells abutting from sides of air chambers) x 20.



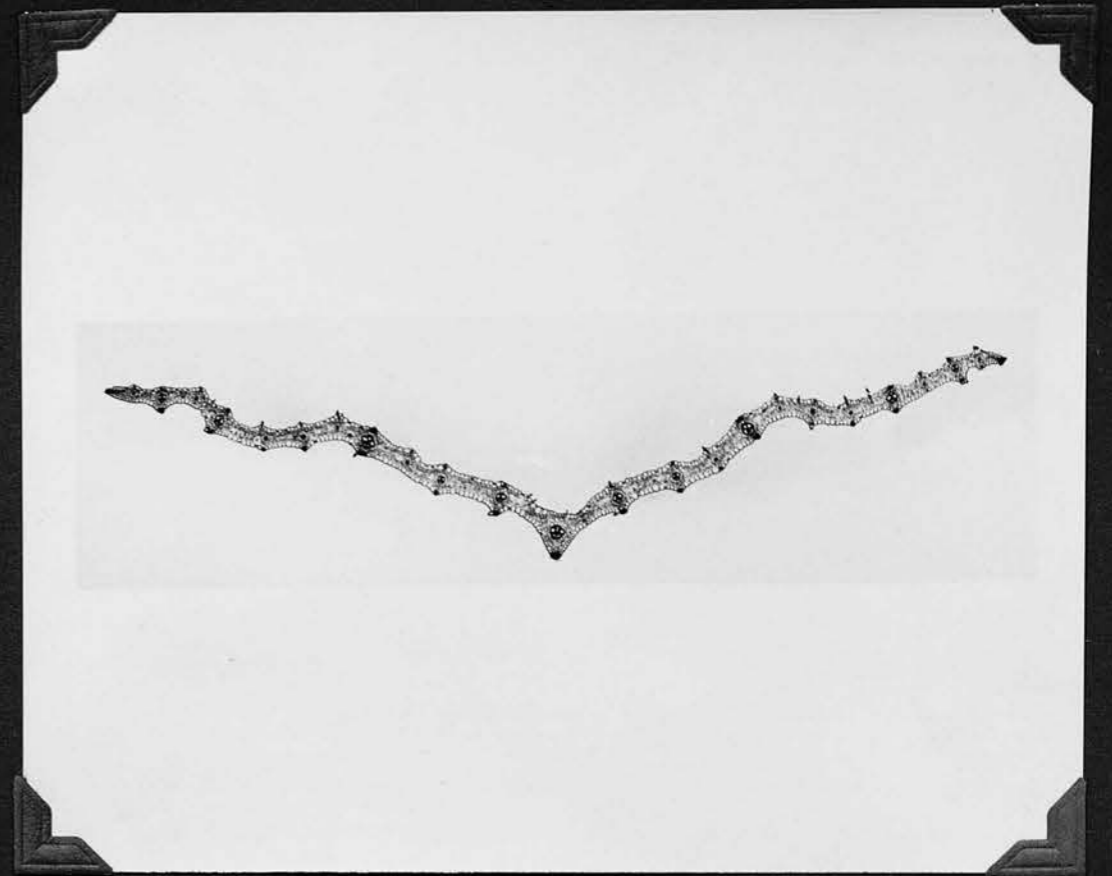
Pl. 39. *Glyceria fluitans* Br. x 30.



Pl. 40. *Glyceria fluitans*, var. *plicata* Fr. x 25.



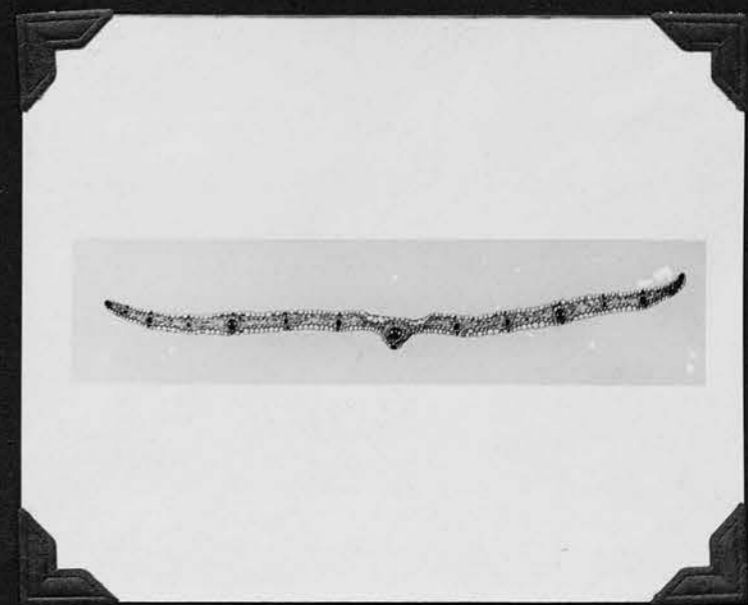
Pl. 41a. *Poa trivialis* L. (normal form) x 30.



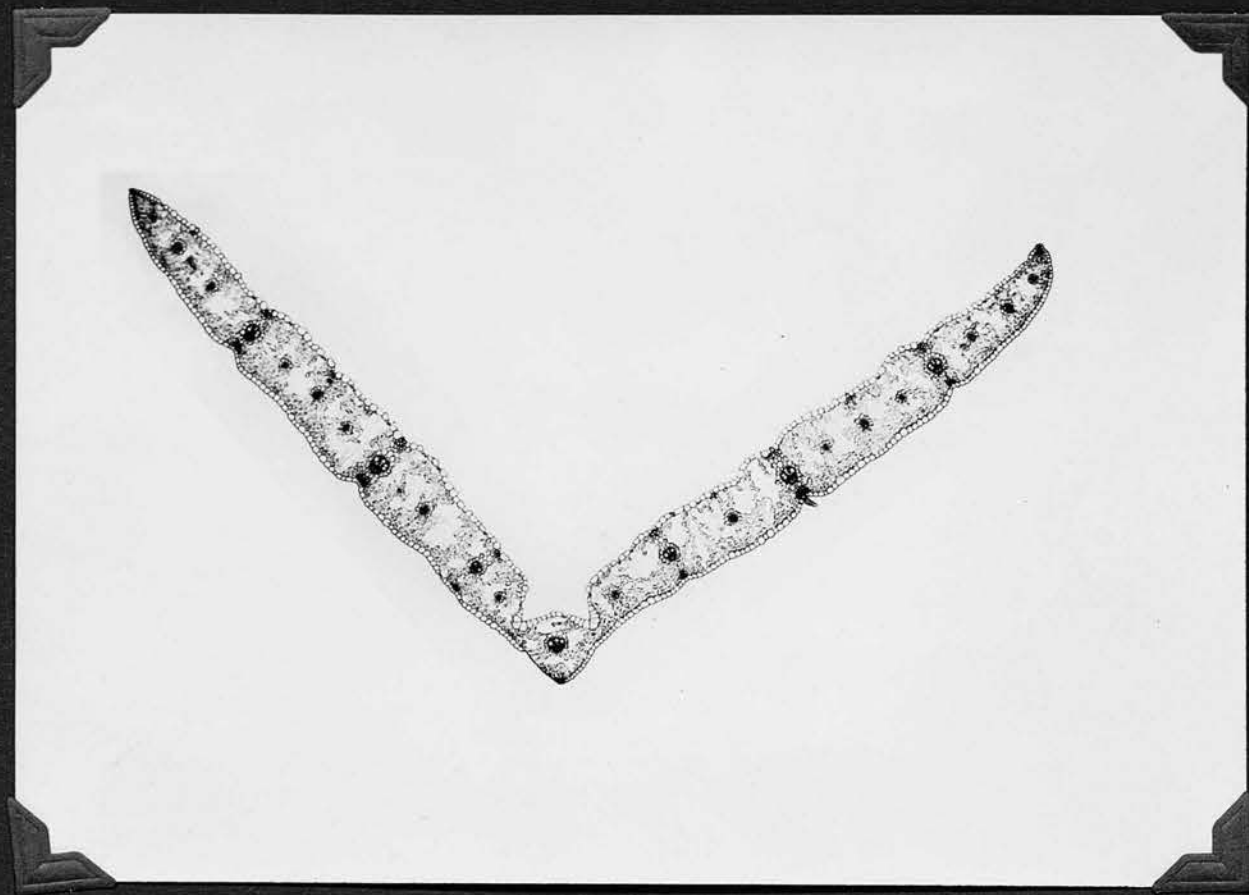
Pl. 41b. *Poa trivialis* L. (unusual form) x 25.



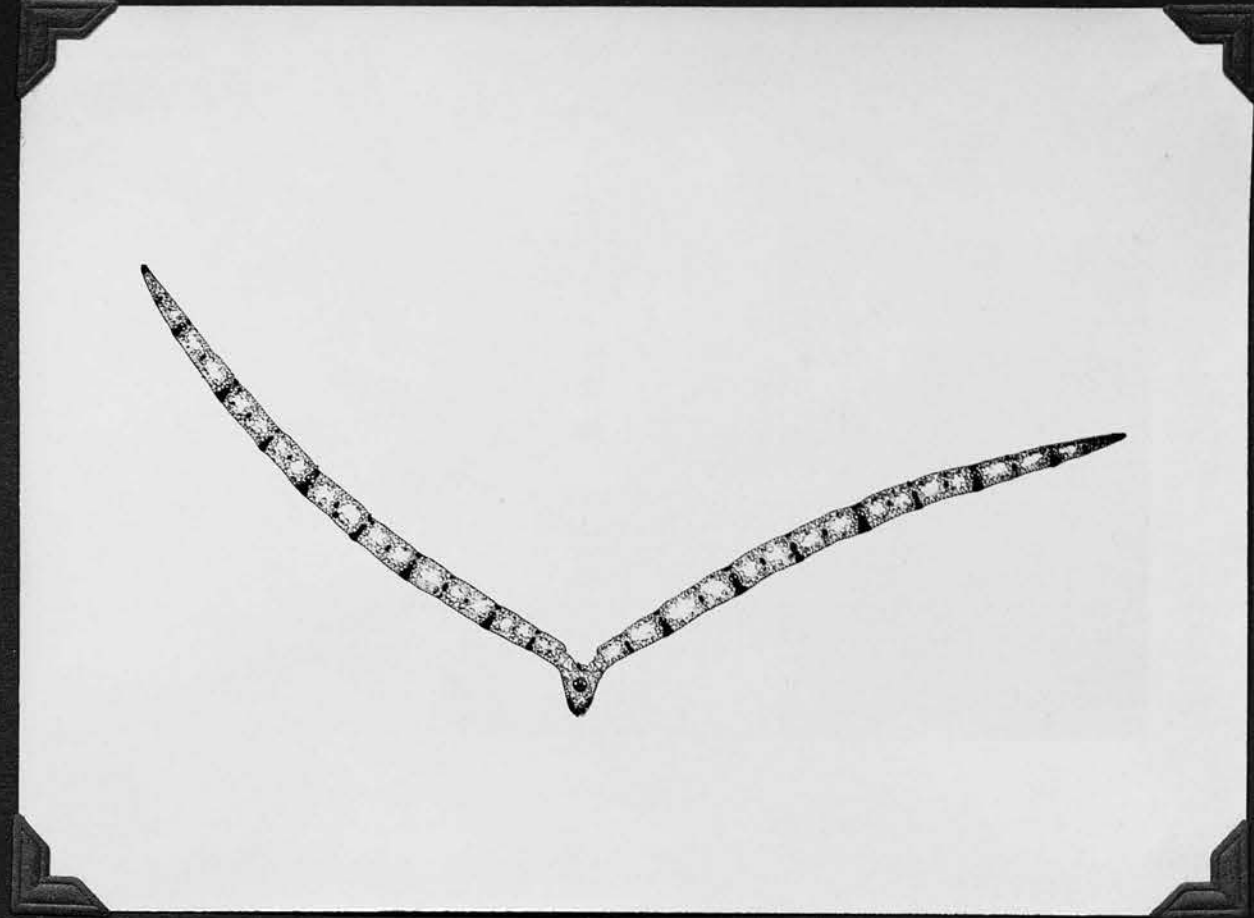
Pl. 42. *Poa nemoralis* L. x 30.



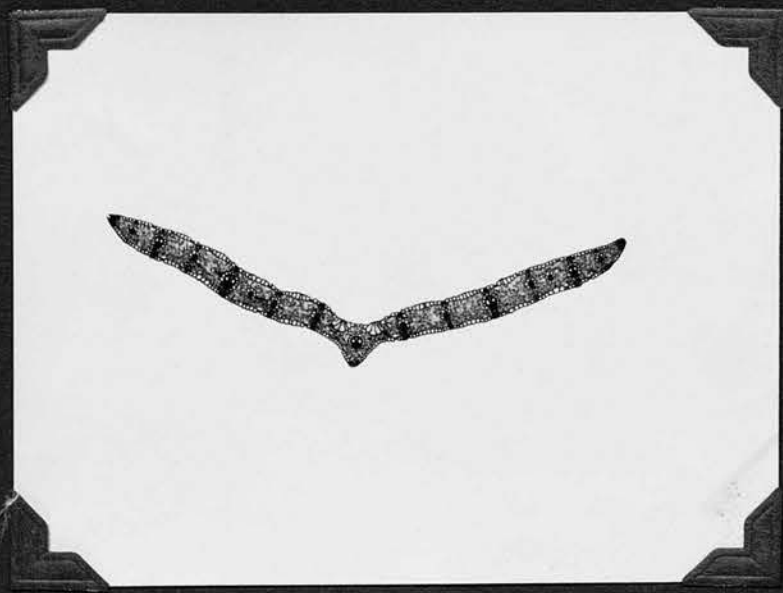
Pl. 43. *Poa annua* L. x 30.



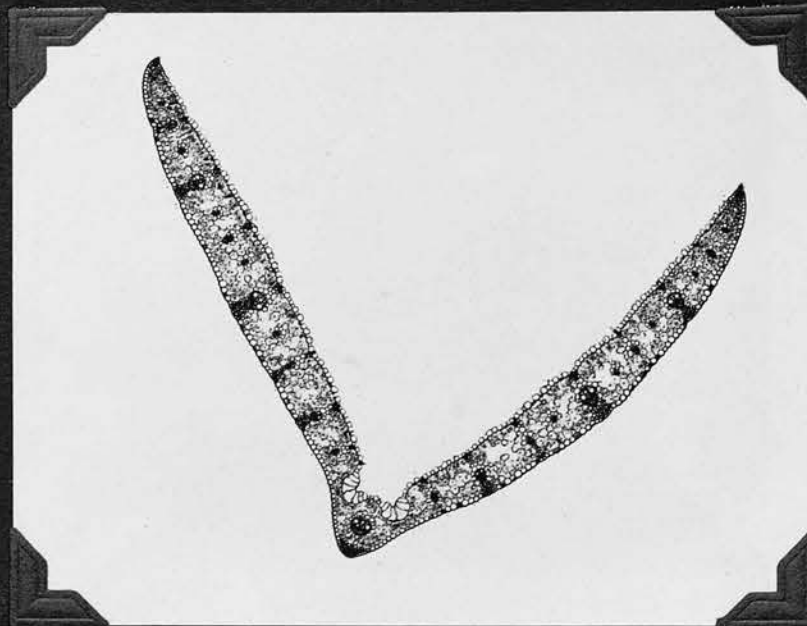
Pl. 44. *Avena pubescens* Huds. x 30.



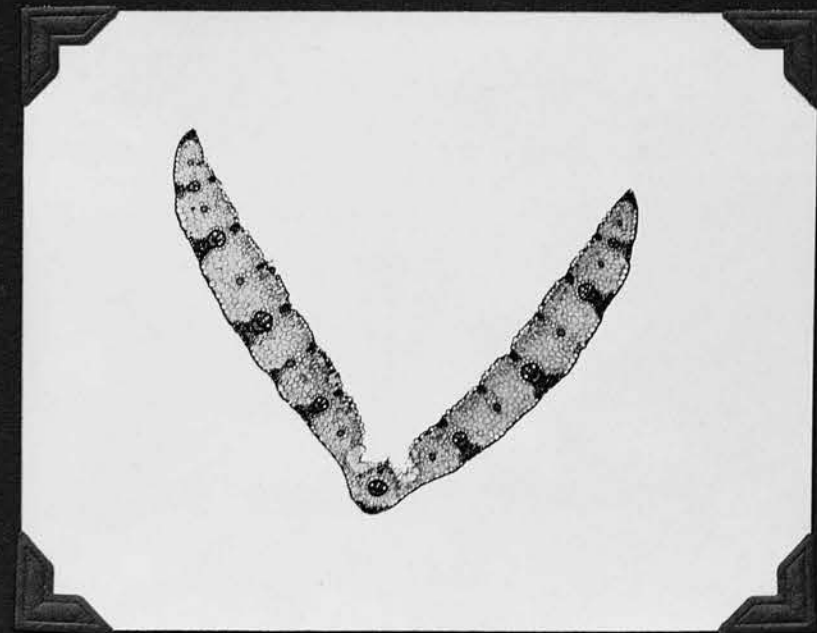
Pl. 45. *Poa chaixii* Vill. x 35.



Pl. 46. *Poa compressa* L. x 30.



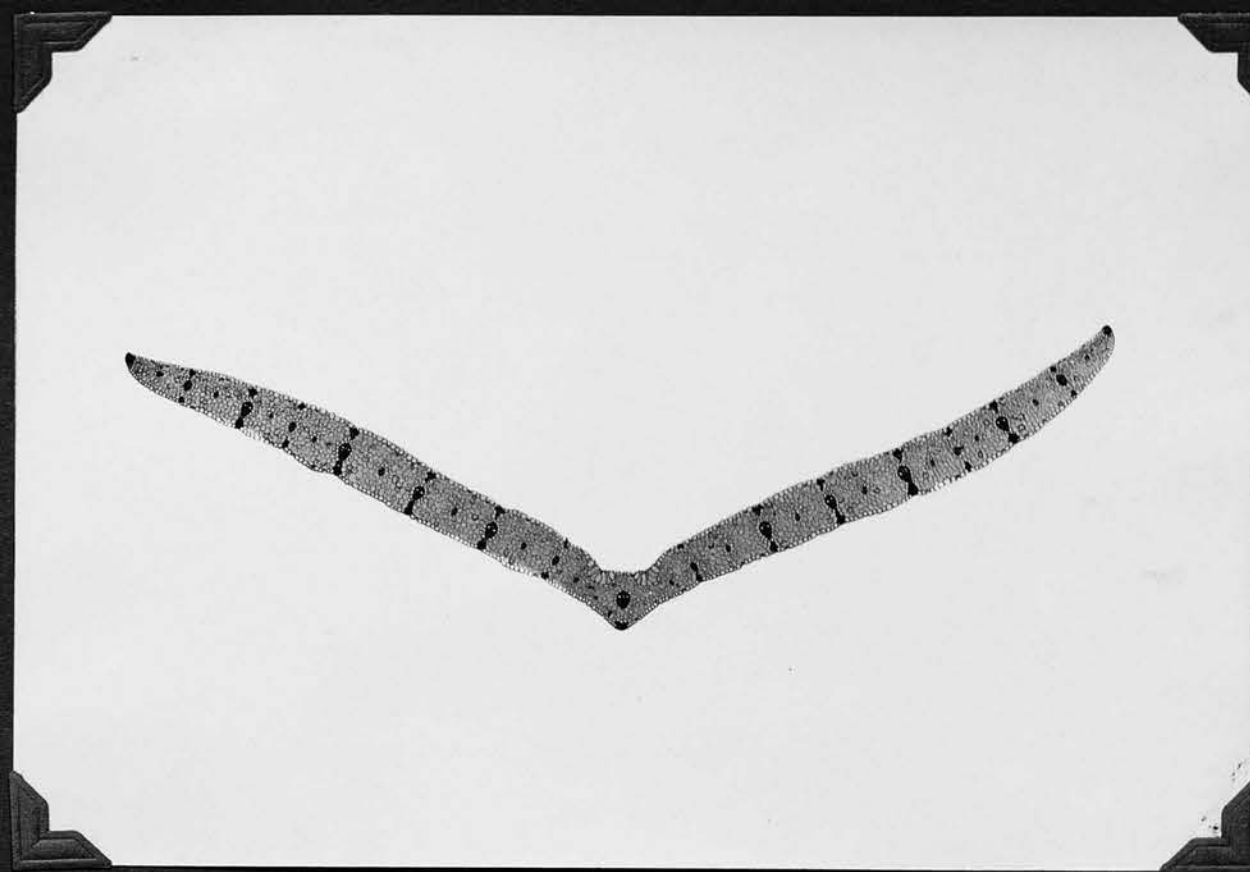
Pl. 47a. *Poa pratensis* L. x 35.



Pl. 47b. *Poa pratensis* L. x 35.



Pl. 48. *Poa alpina*, var. *acutifolia*
Dr. = *P. stricta* Syme x 30.



Pl. 49. *Poa alpina* L. x 30.



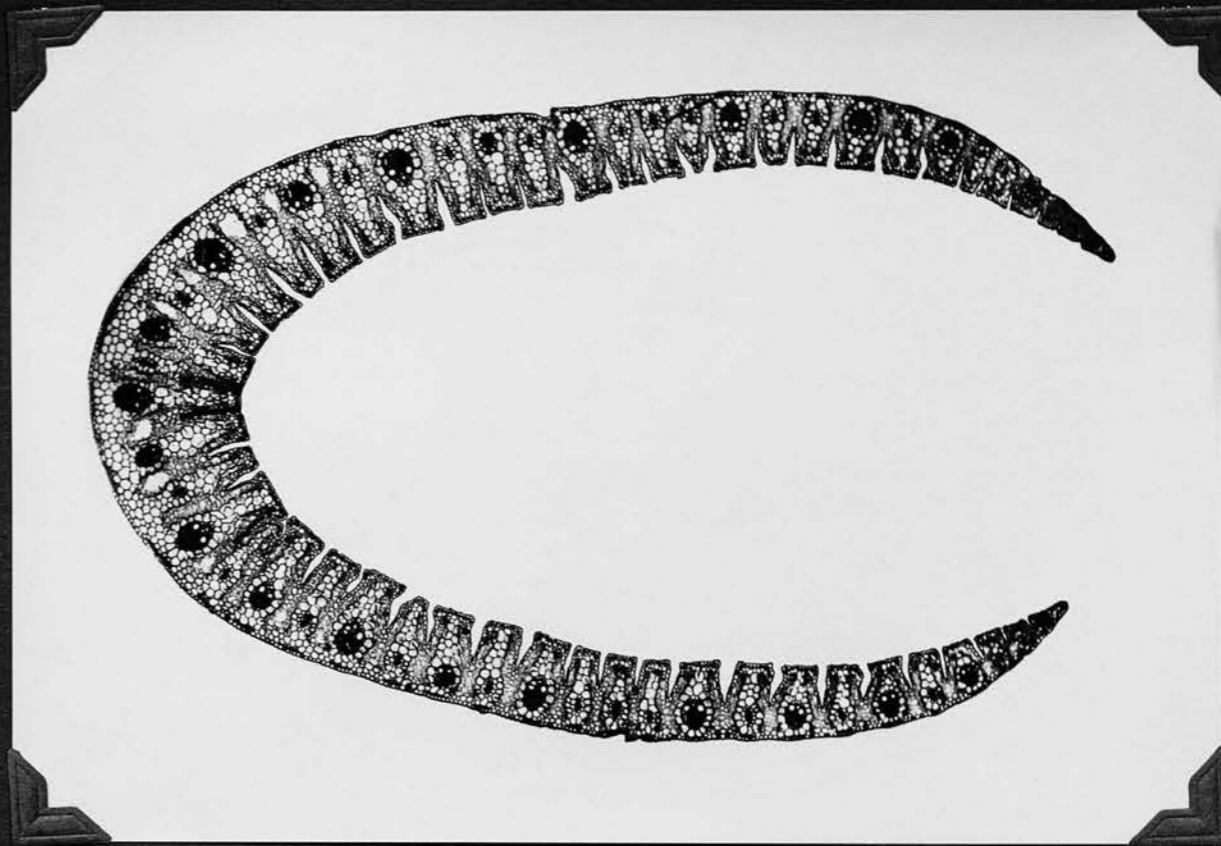
Pl. 50. *Avena pratensis* L. x 30.



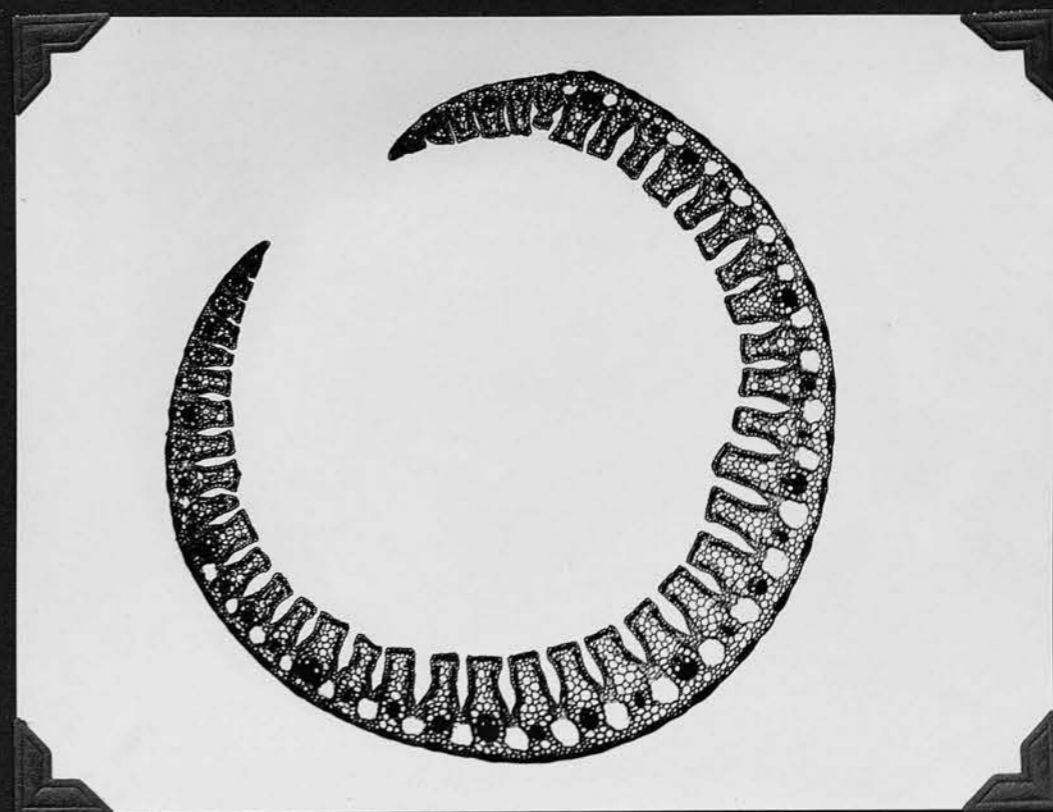
Pl. 51. *Sesleria coerulea* Ard. x 30.



Pl. 52. *Spartina stricta* Roth. x. 35.



Pl. 53. *Spartina alterniflora* Loiss. x 30.



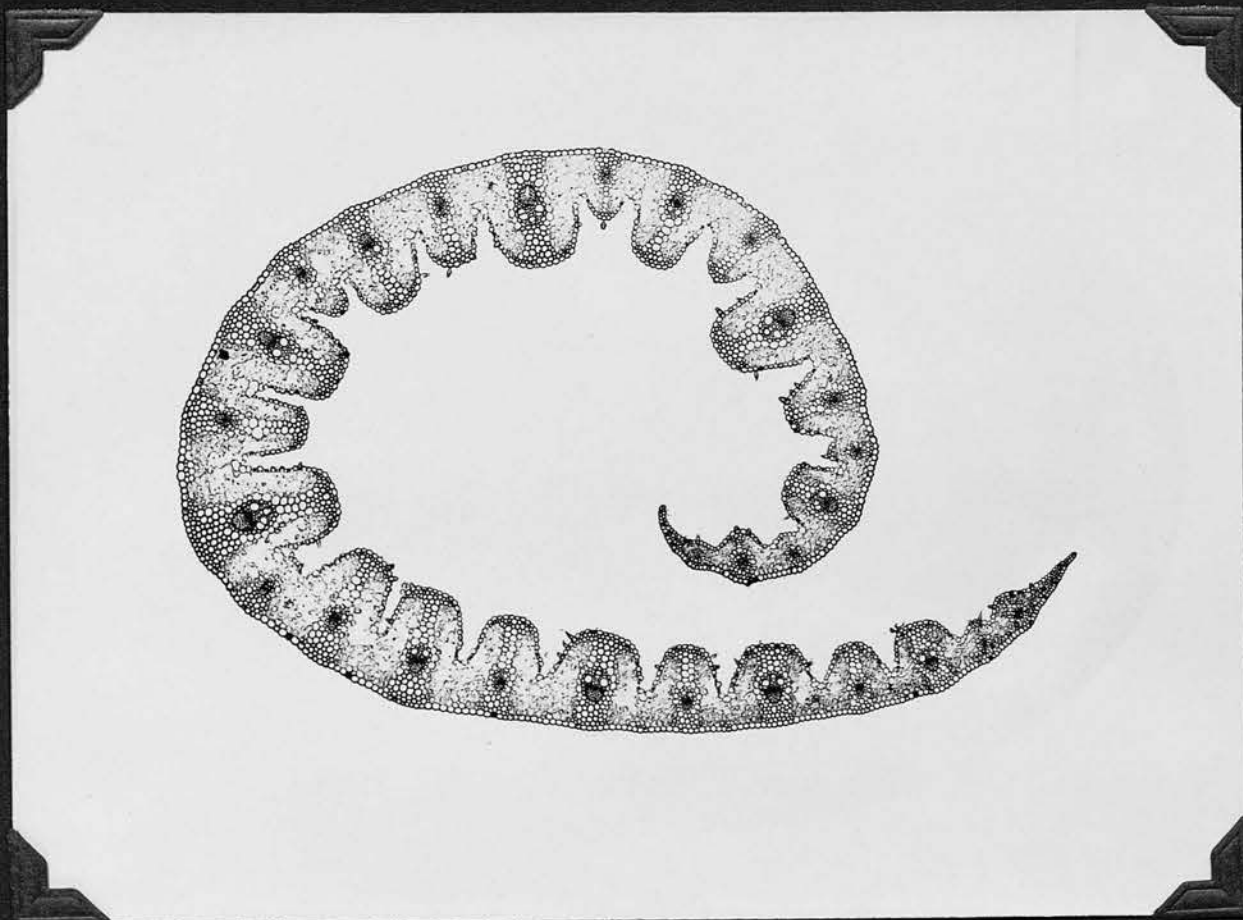
Pl. 54. *Spartina Townsendii* x 30.



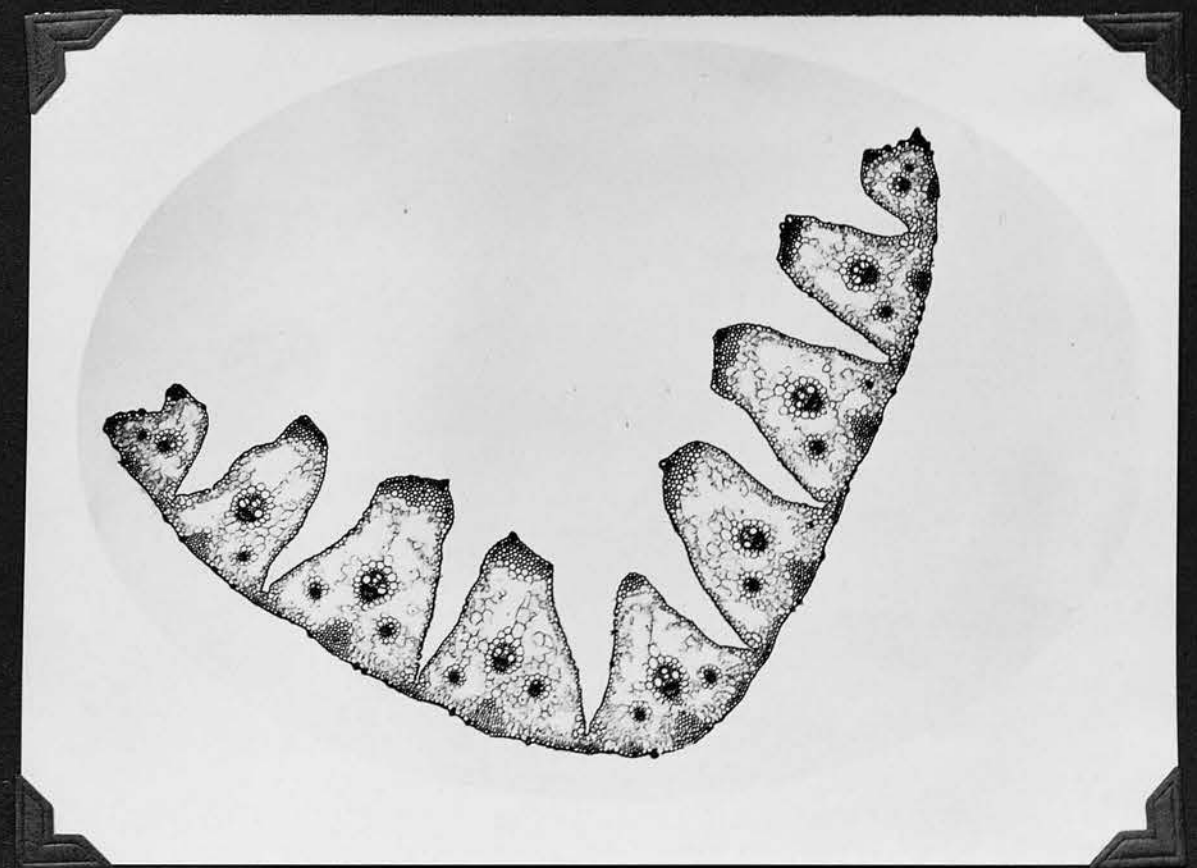
Pl. 55. *Agropyron junceum* Beauv. x 30.



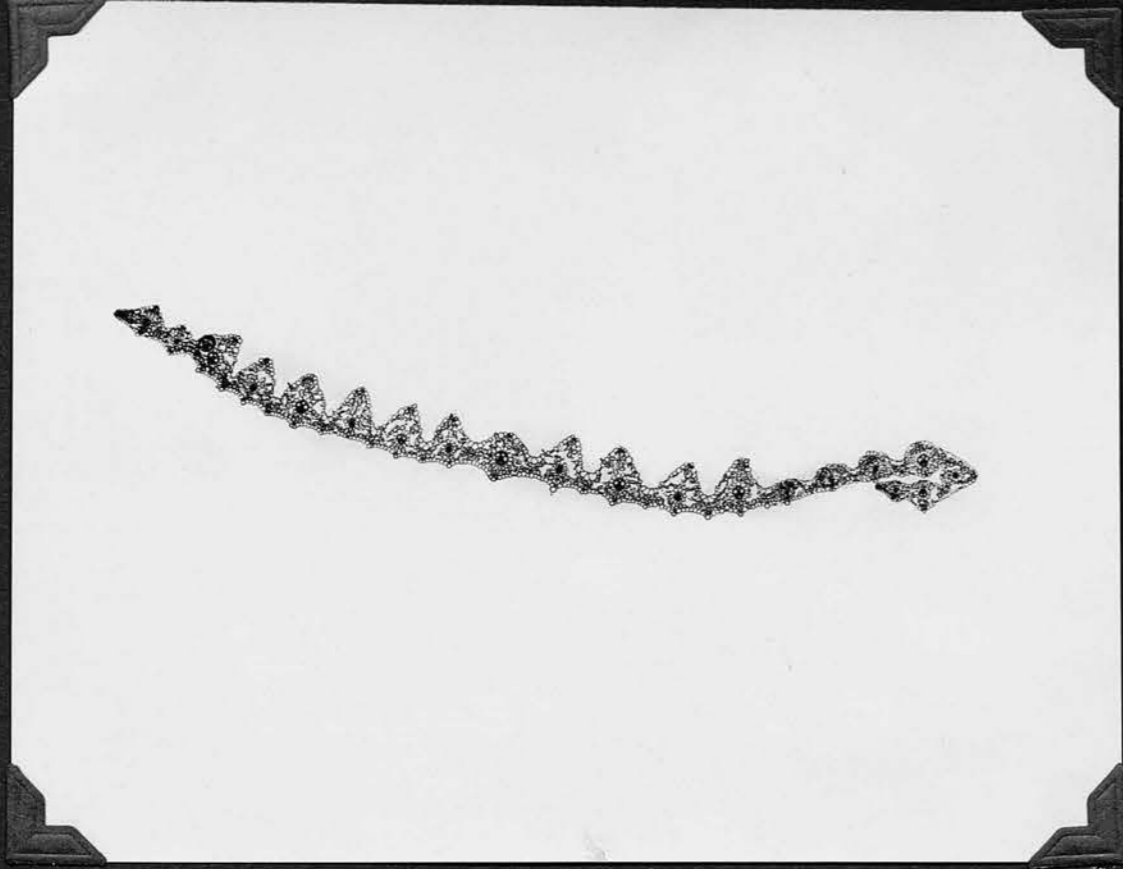
Pl. 56. *Agropyron pungens* R. & S. x 30.



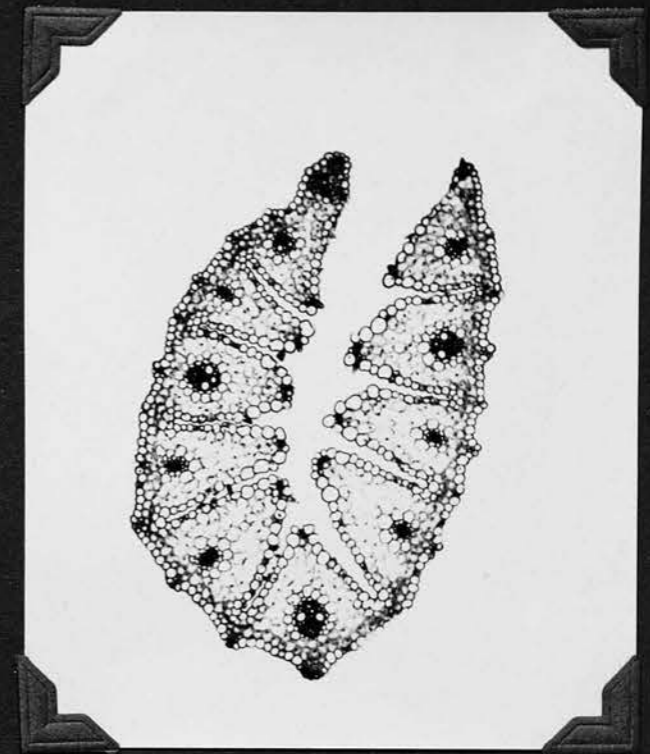
Pl. 57. *Elymus arenarius* L. x 35.



Pl. 58. *Deschampsia caespitosa* Beauv. x 35.



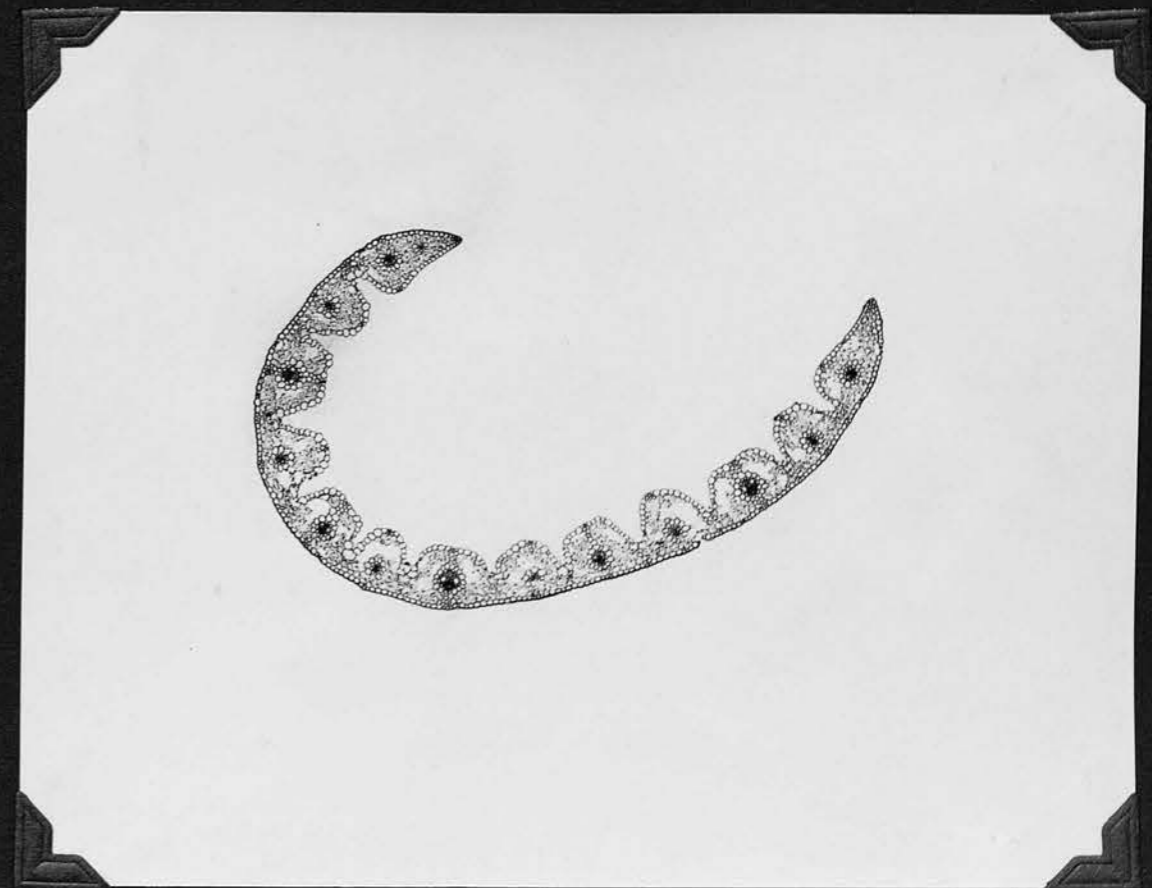
Pl. 59a. *Alopecurus geniculatus* L. x 30.



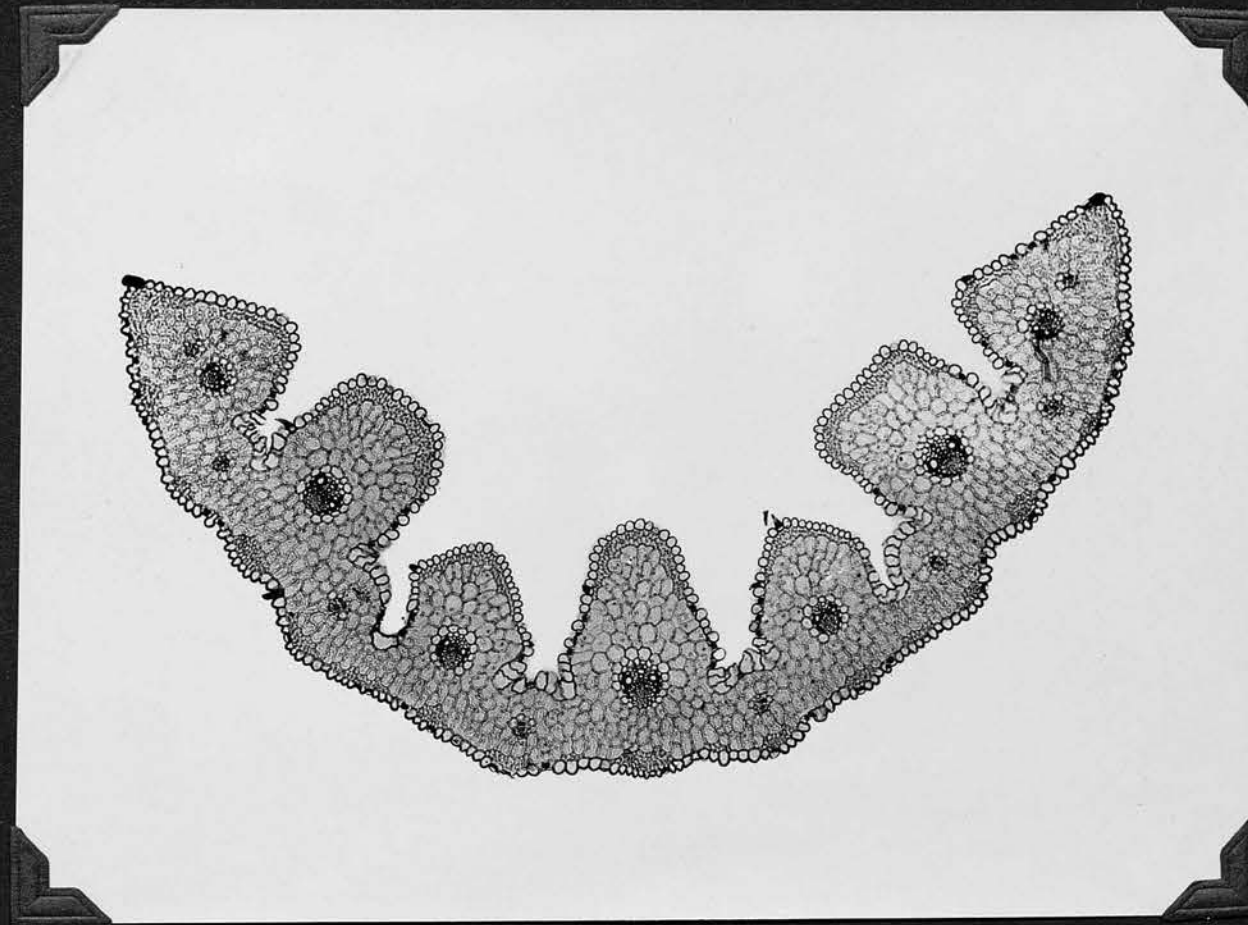
Pl. 59b. *Alopecurus geniculatus*
L., var. *bulbosus* Gouan x 90.



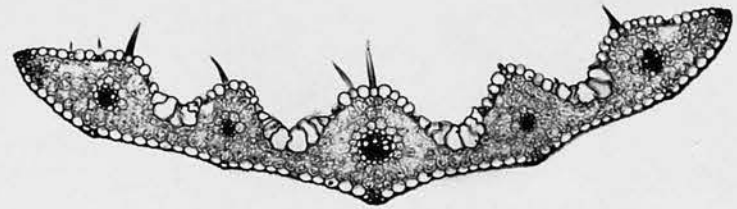
Pl. 60a. *Alopecurus alpinus* Sm.
(basal leaf) x 35.



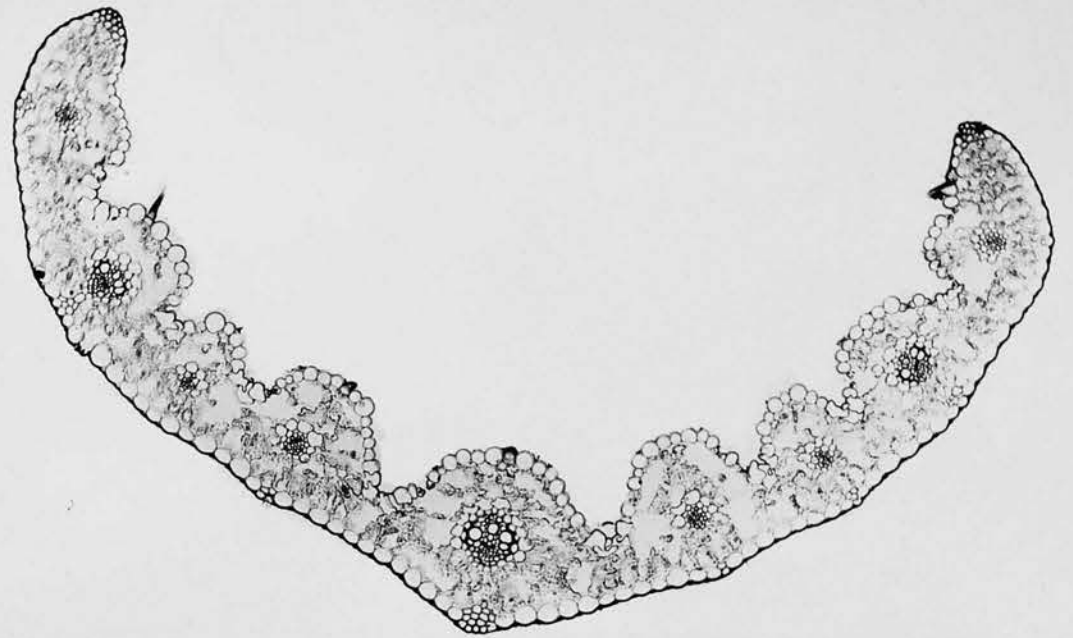
Pl. 60b. *Alopecurus alpinus* Sm. (culm leaf) x 35.



Pl. 61. *Koeleria vallesiana* A. & G. x 60.



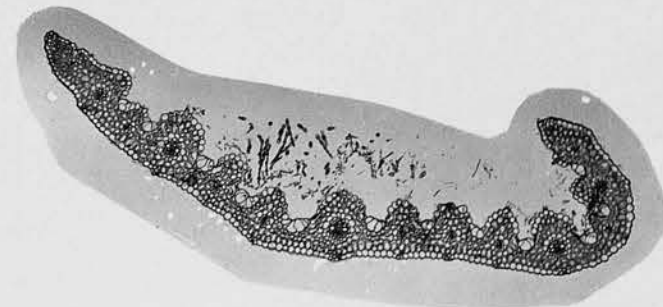
Pl. 62. *Festuca bromoides* L. = *Vulpia bromoides*
Gray x 100.



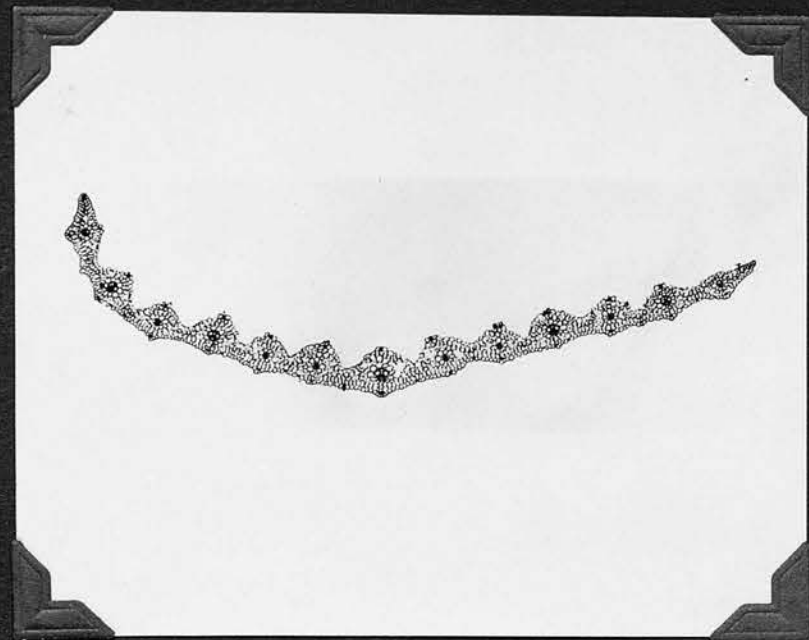
Pl. 63a. *Festuca myuros* L. = *Vulpia myuros* Gray x 100.



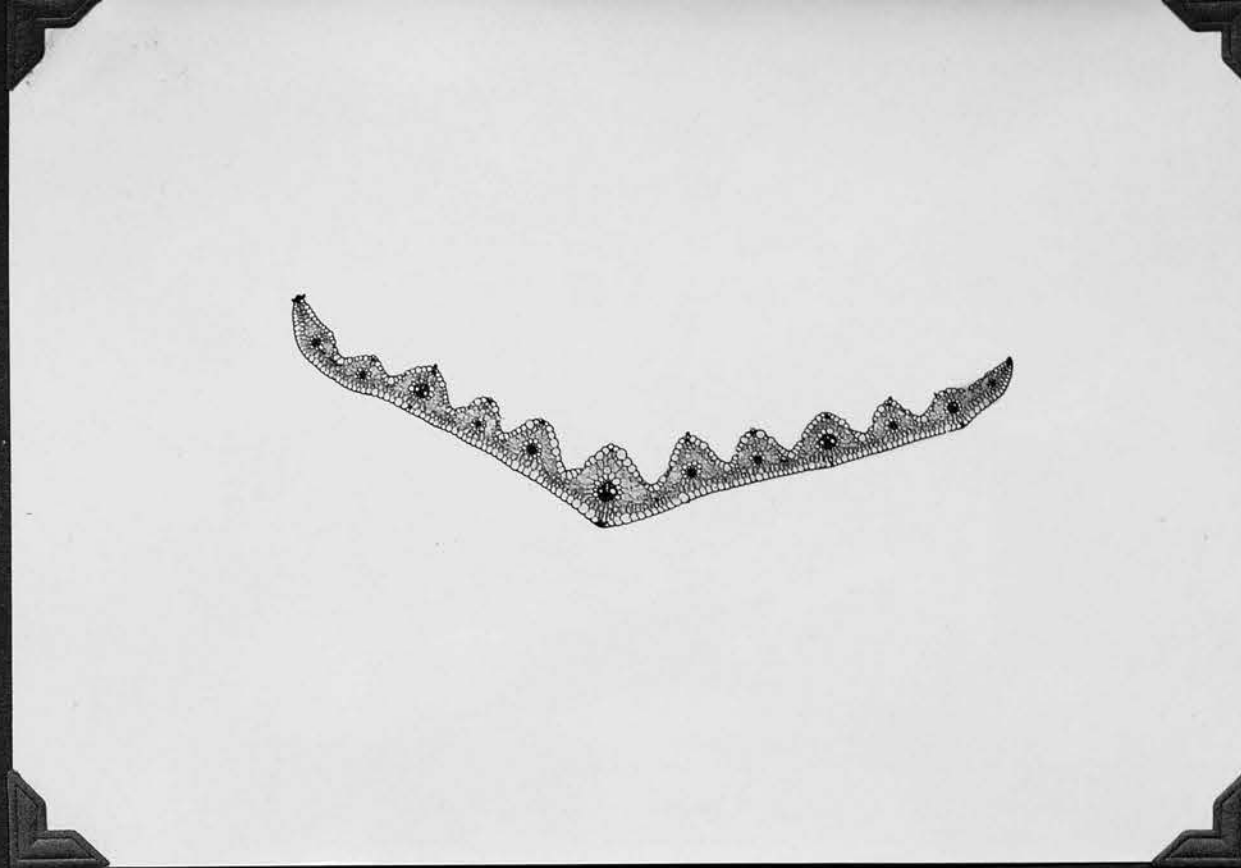
Pl. 63b. *Festuca myuros* L. = *Vulpia*
myuros Gray x 100.



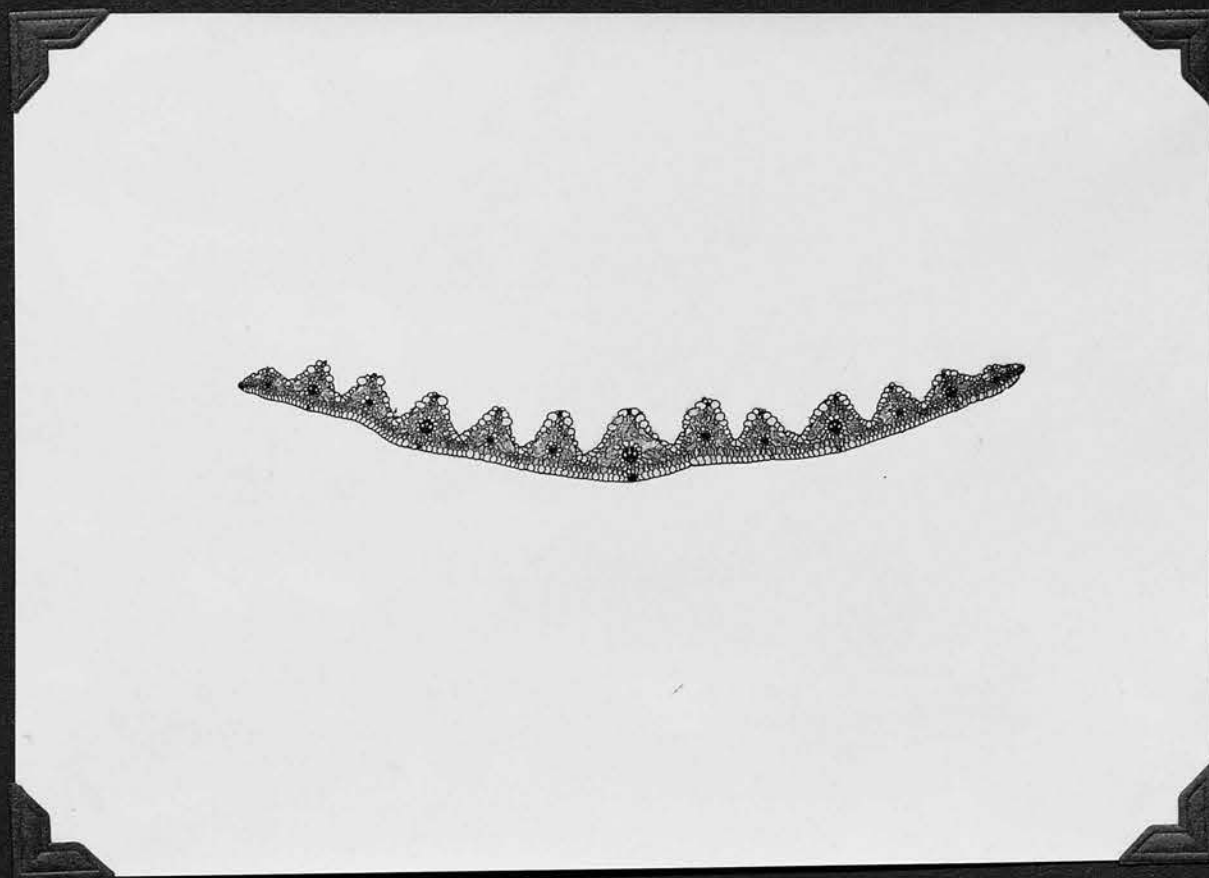
Pl. 64. *Festuca rigida* Kunth (characteristic shape but
infected with *Erysiphe graminis*) x 50.



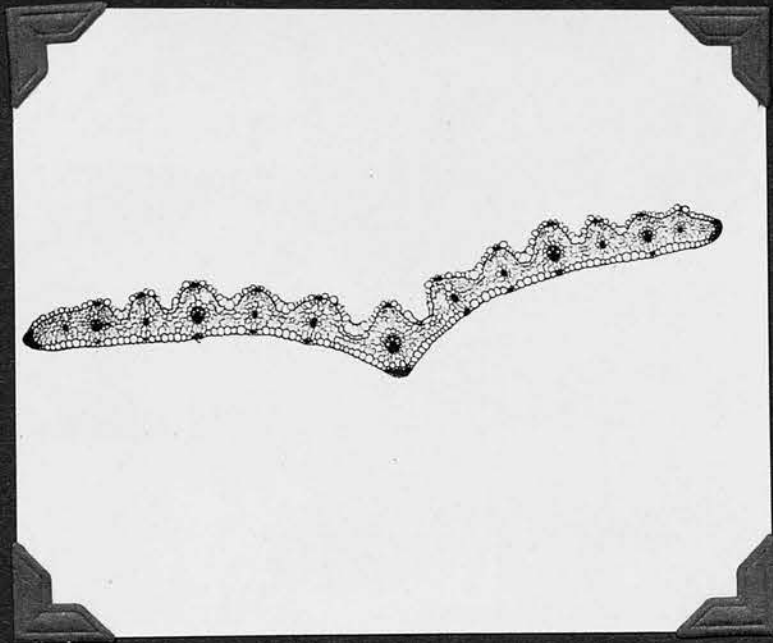
Pl. 65. *Alopecurus myosuroides* Huds.
x 30.



Pl. 66. *Lolium temulentum* L. x 30.



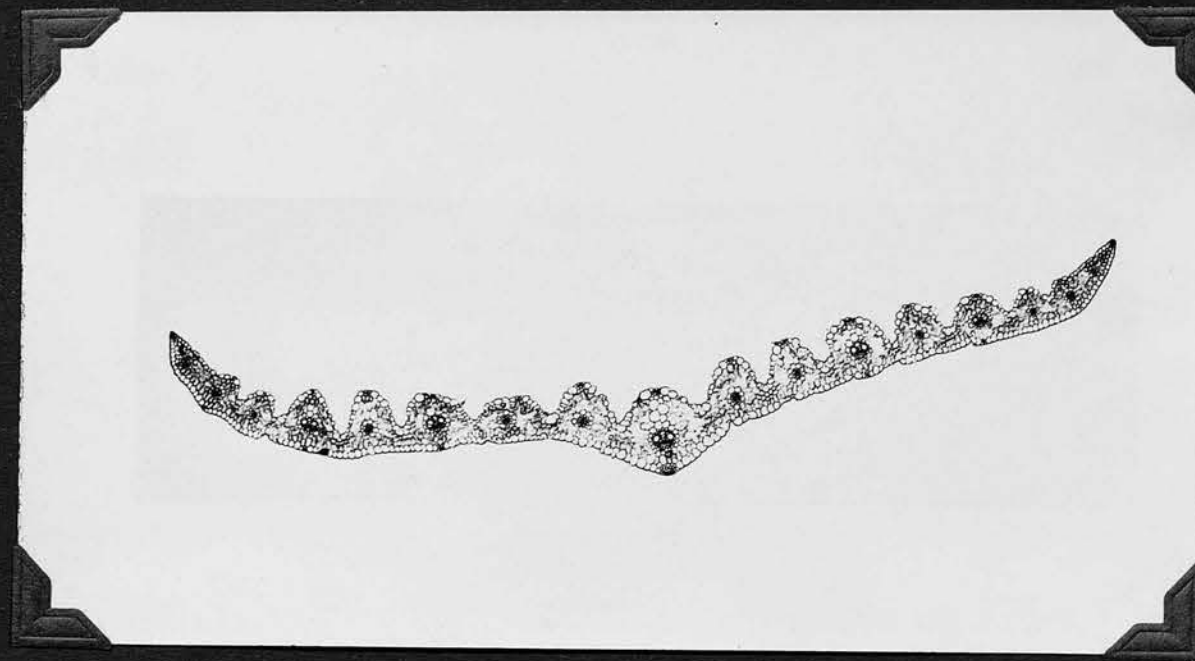
Pl. 67. *Lolium remotum* Schrank. x 30.



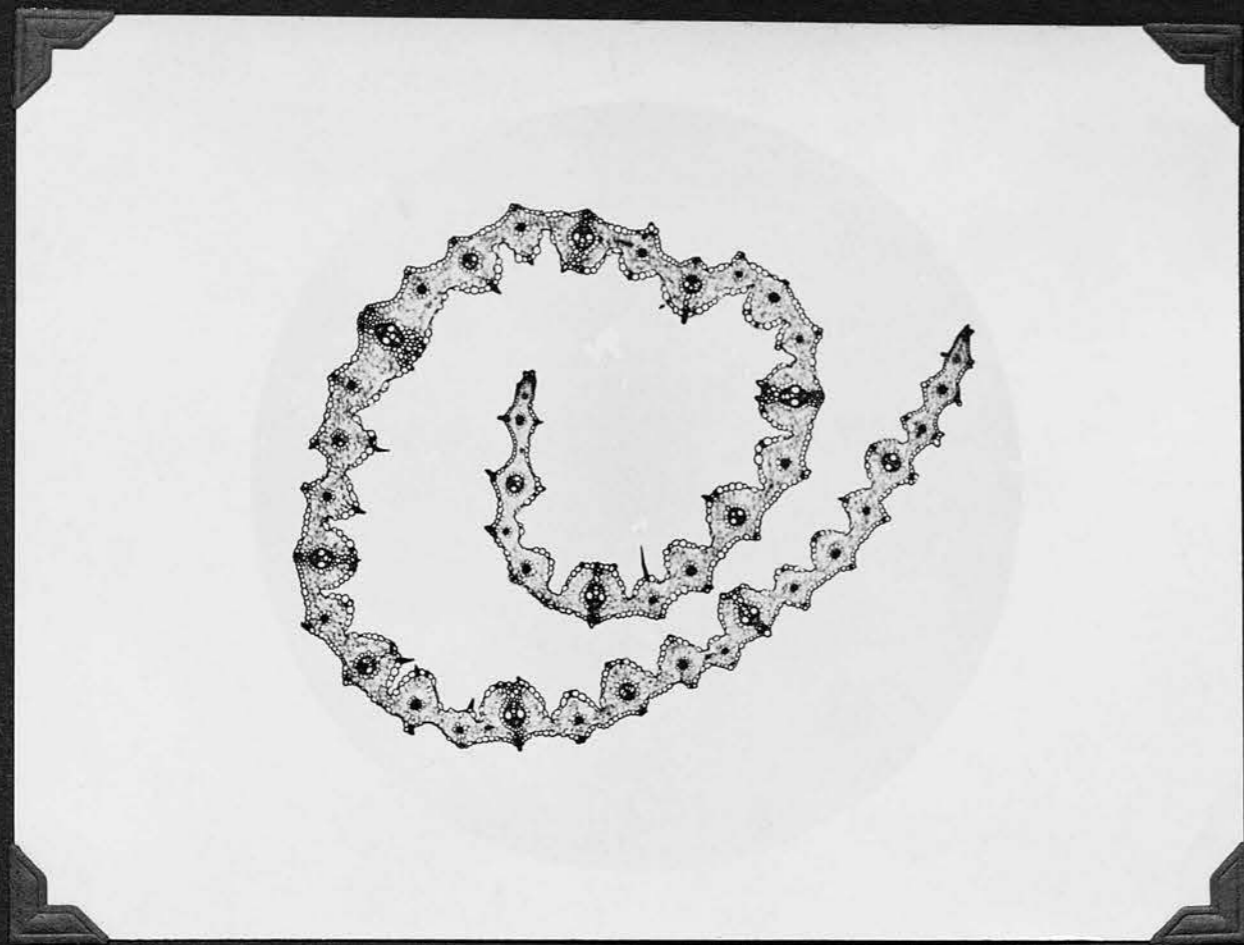
Pl. 68. *Cynosurus cristatus* L. x 35.



Pl. 69. *Lolium perenne* L. x 30.



Pl. 70. *Lolium multiflorum* Lam. x 35.



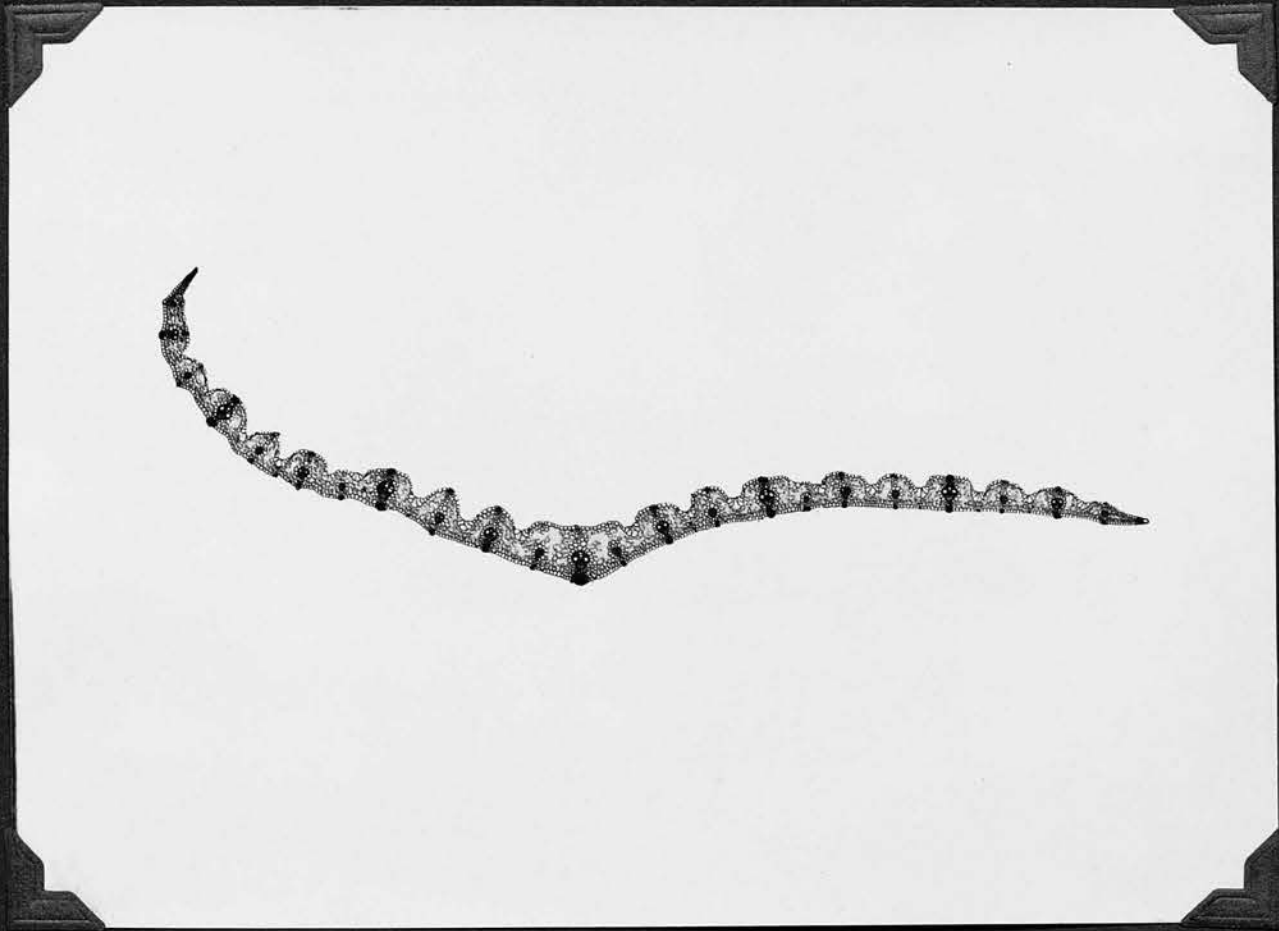
Pl. 71. *Apera spica-venti* Beauv. x 30.



Pl. 72. *Trisetum flavescens* Beauv. x 35.



Pl. 73. *Arrhenatherum elatius* M. & K. x 25.



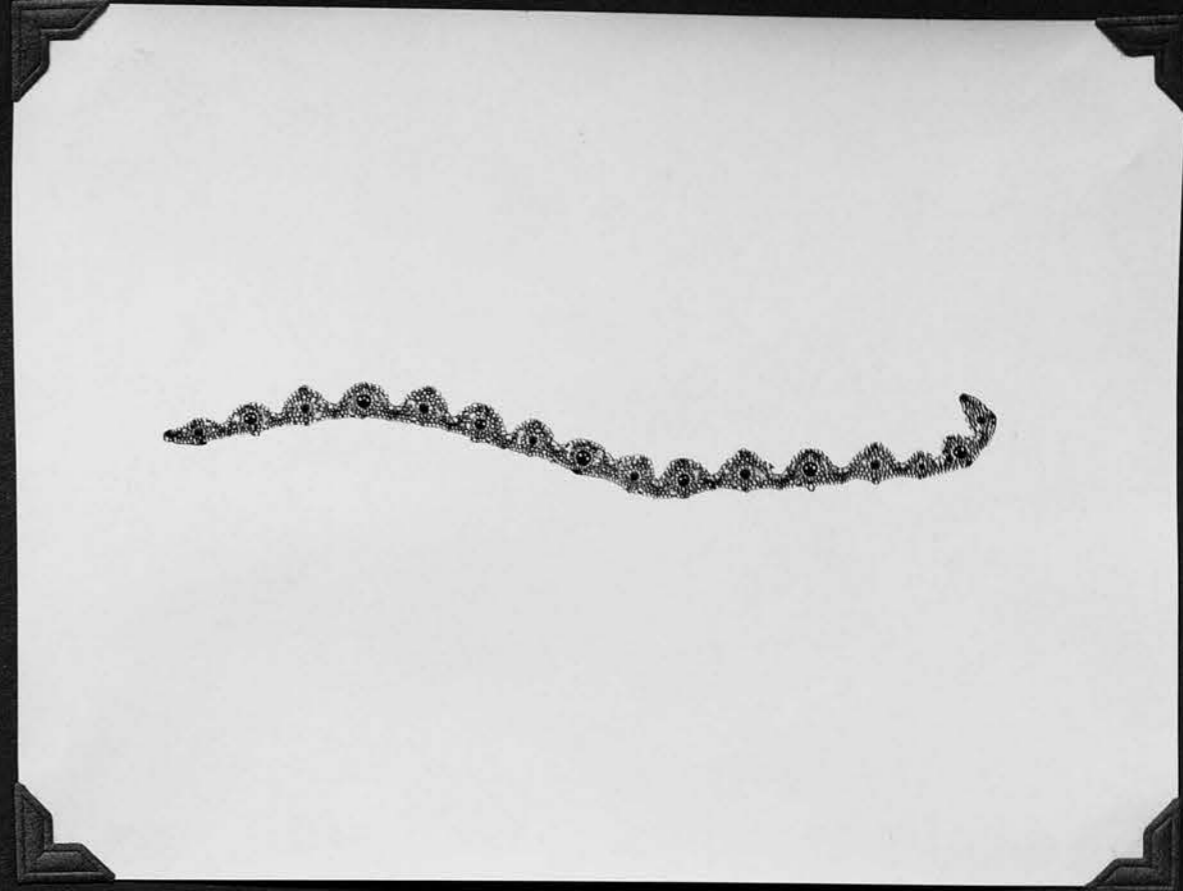
Pl. 74a. *Alopecurus pratensis* L. x 20.



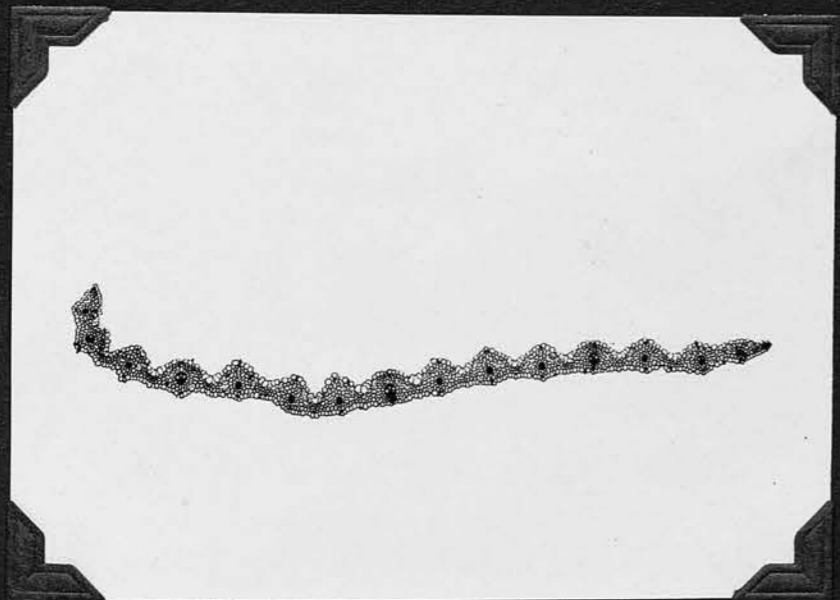
Pl. 74b. *Alopecurus pratensis* L. (markedly glaucous form) x 20.



Pl. 75. *Agrostis canina* L. (linear form of leaf) x 50.



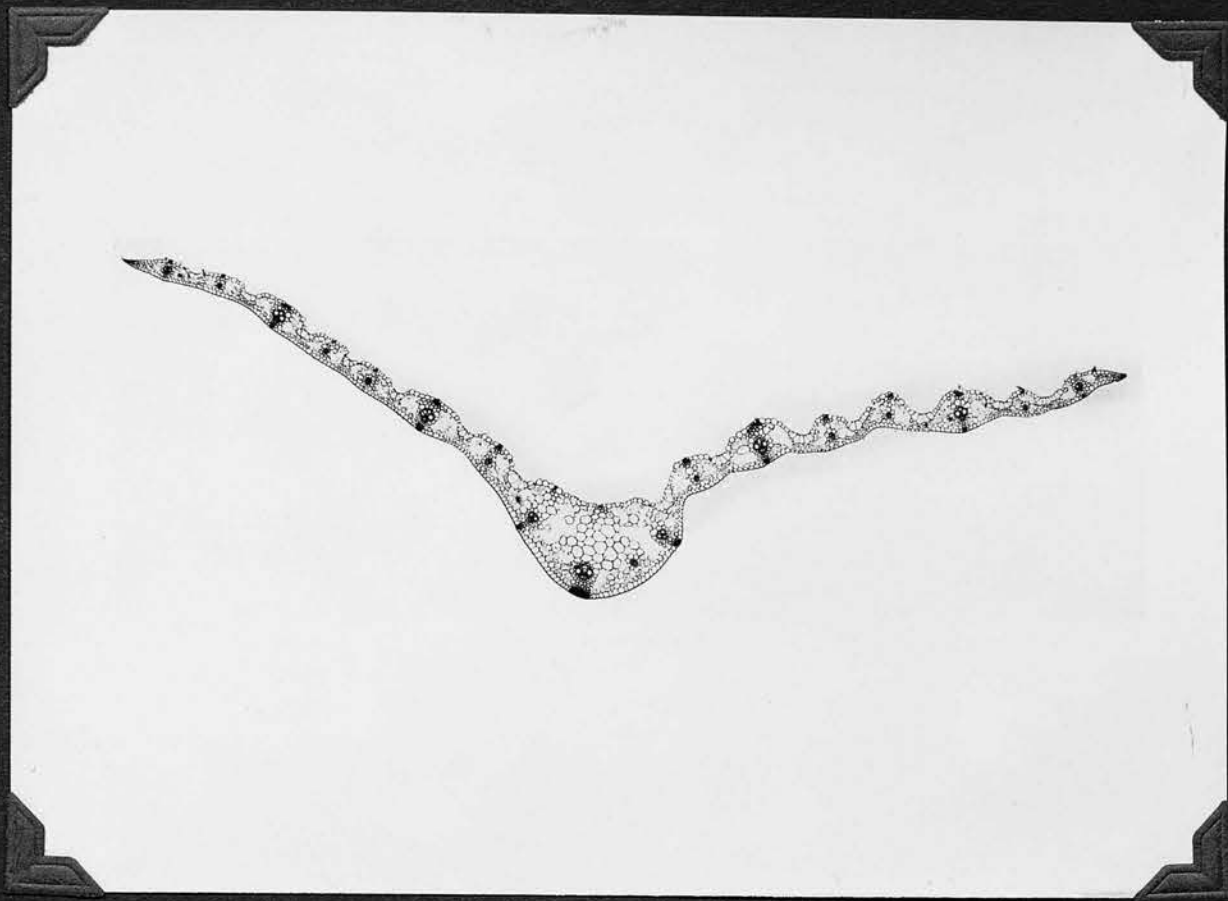
Pl. 76. *Agrostis tenuis* Sibth. x 35.



Pl. 77. *Agrostis stolonifera* L. x 30.



Pl. 78. *Agrostis nigra* With. x 20.



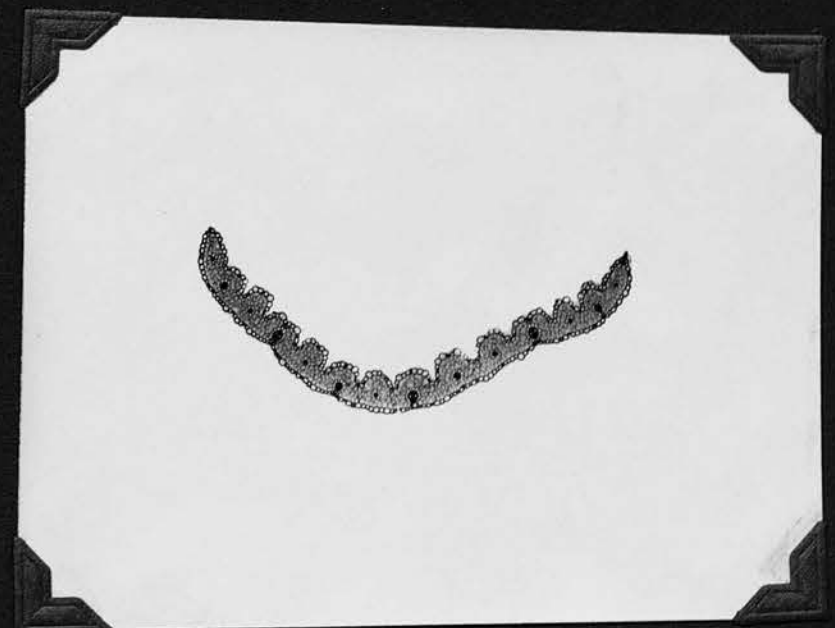
Pl. 79. *Festuca gigantea* Vill. x 25.



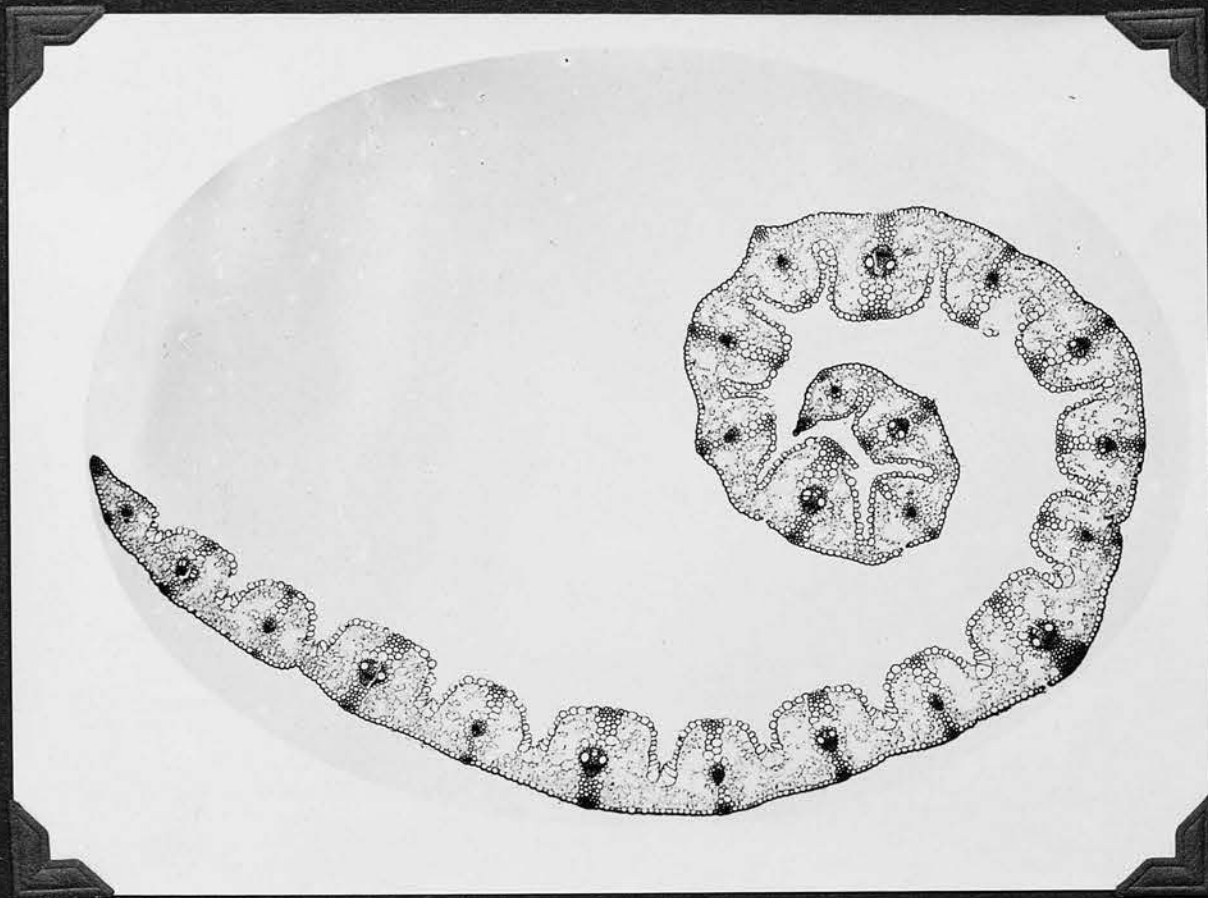
Pl. 80a. *Phleum pratense* L. (narrow leaved diploid form) x 30.



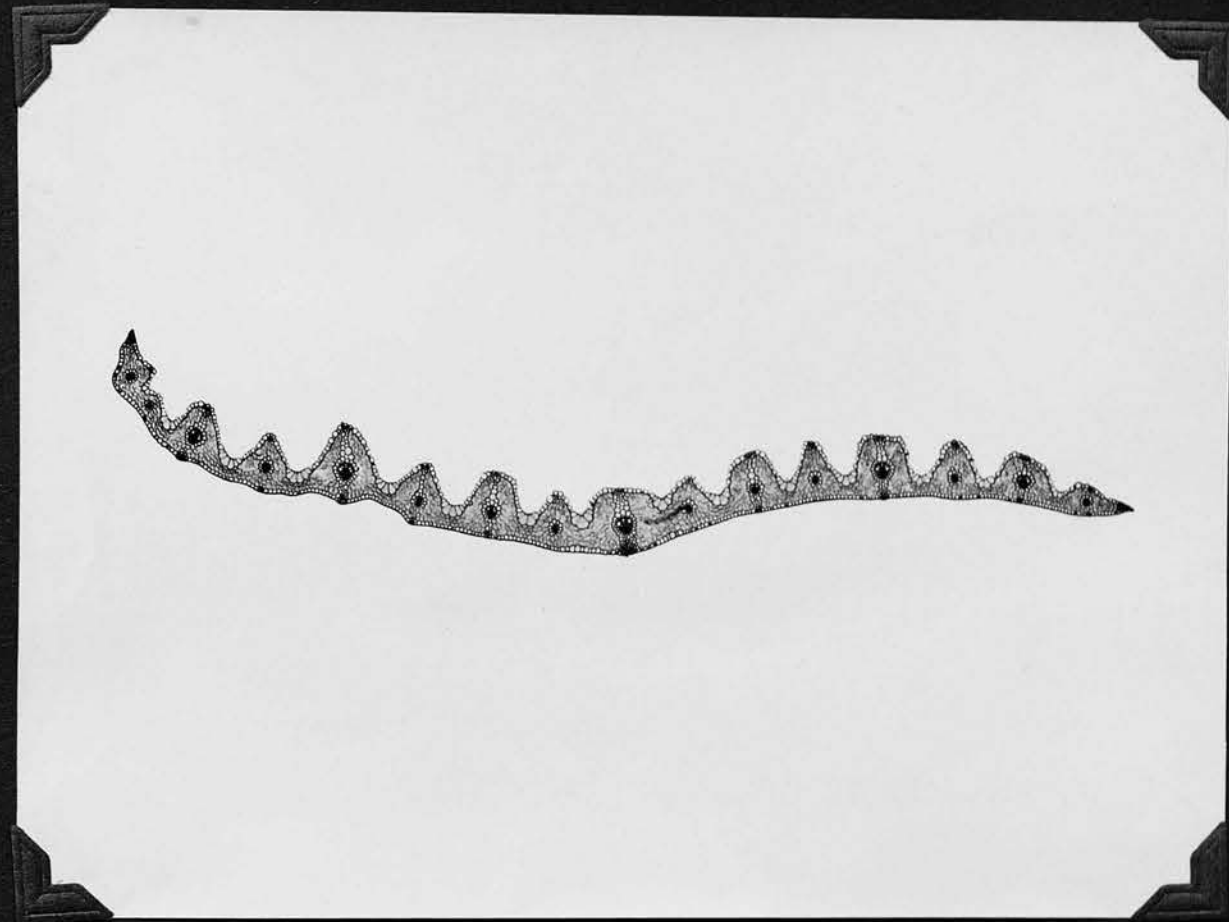
Pl. 80b. *Phleum pratense* L. (broad leaved diploid form) x 30.



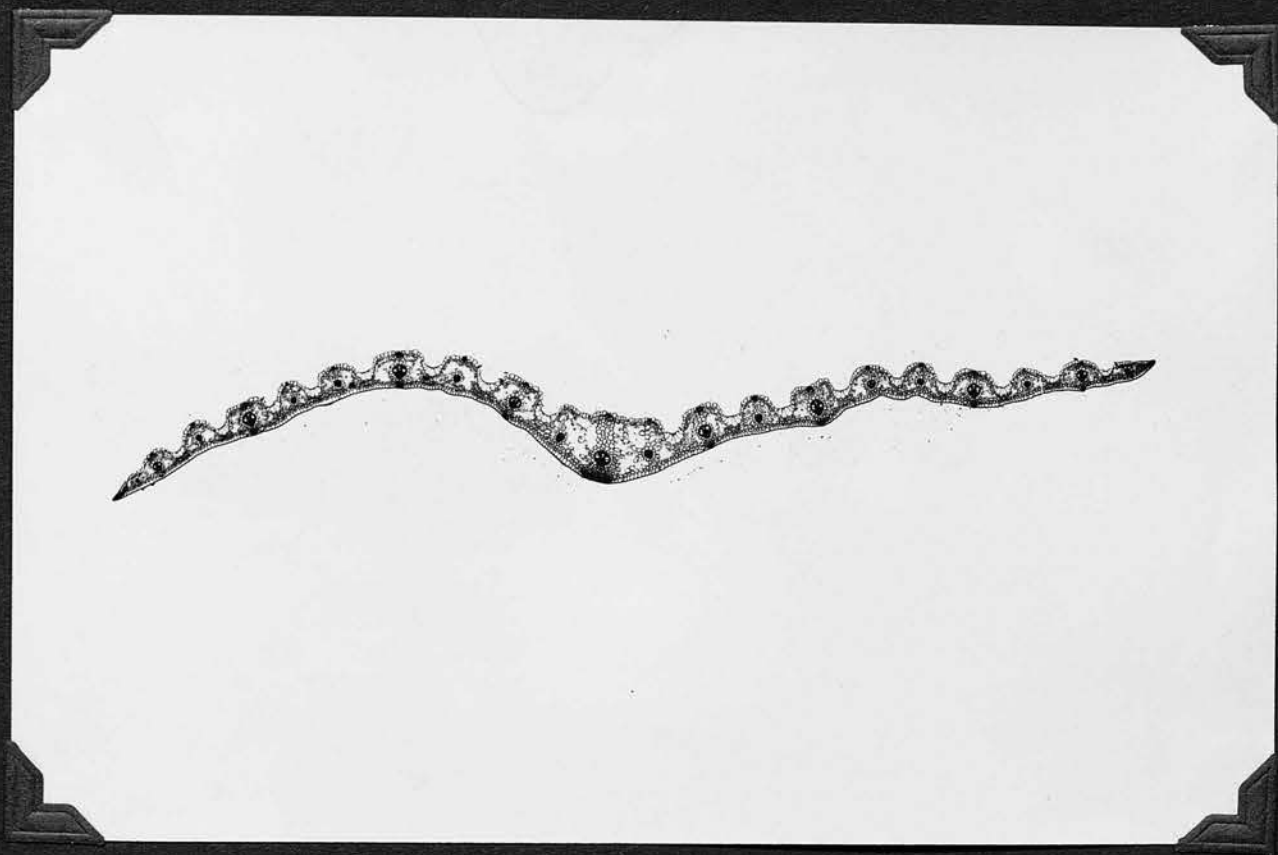
Pl. 81. *Phleum arenarium* L. x 30.



Pl. 82a. *Festuca arundinacea* Schreb. x 35.



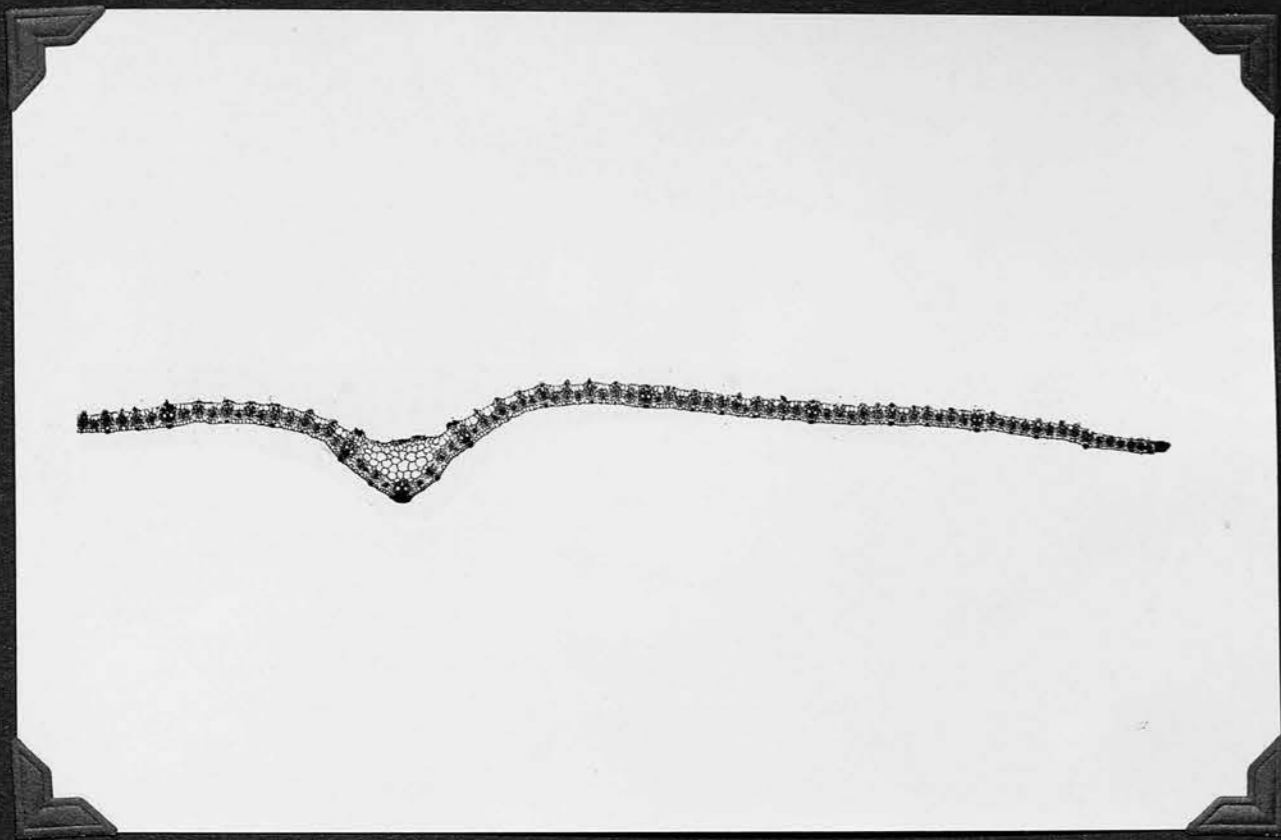
Pl. 82b. *Festuca arundinacea* Schreb. x 25.



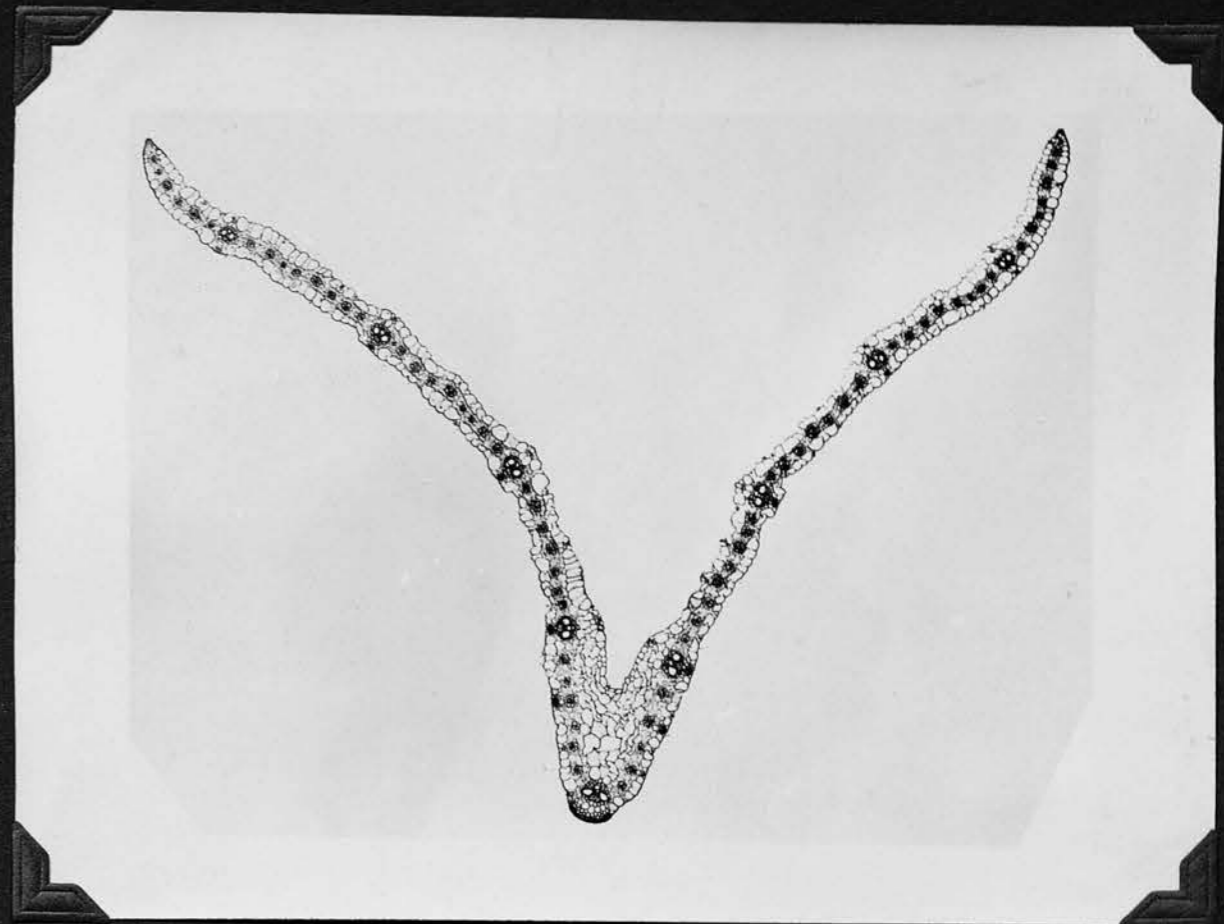
Pl. 83. Festuca pratensis Huds. x 20.



Pl. 84. Lolium multiflorum Lam. (showing stereome girders which is unusual) x 25.



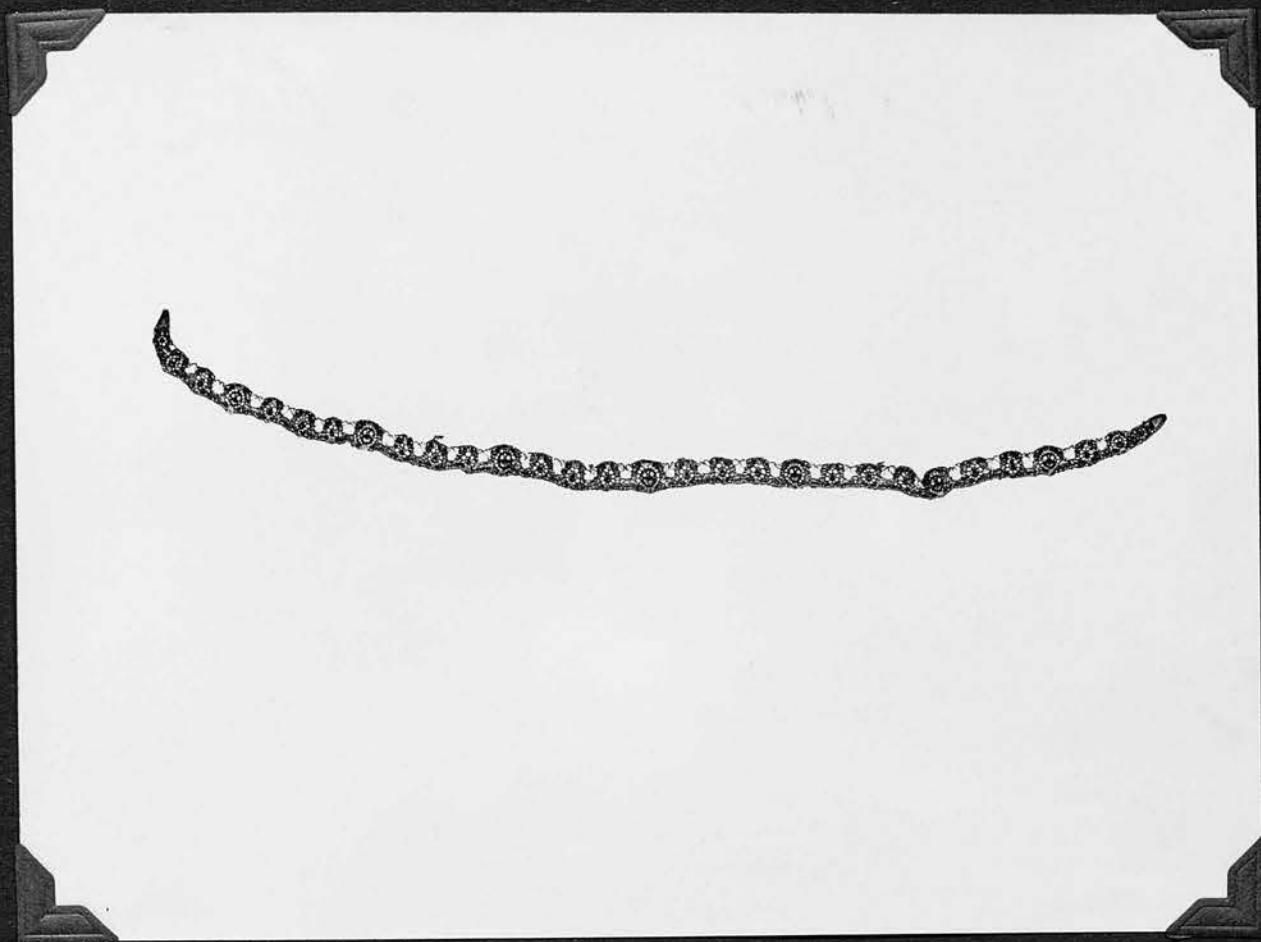
Pl. 85. *Setaria viridis* Beauv. x 20.



Pl. 86. *Setaria glauca* Beauv. x 35.



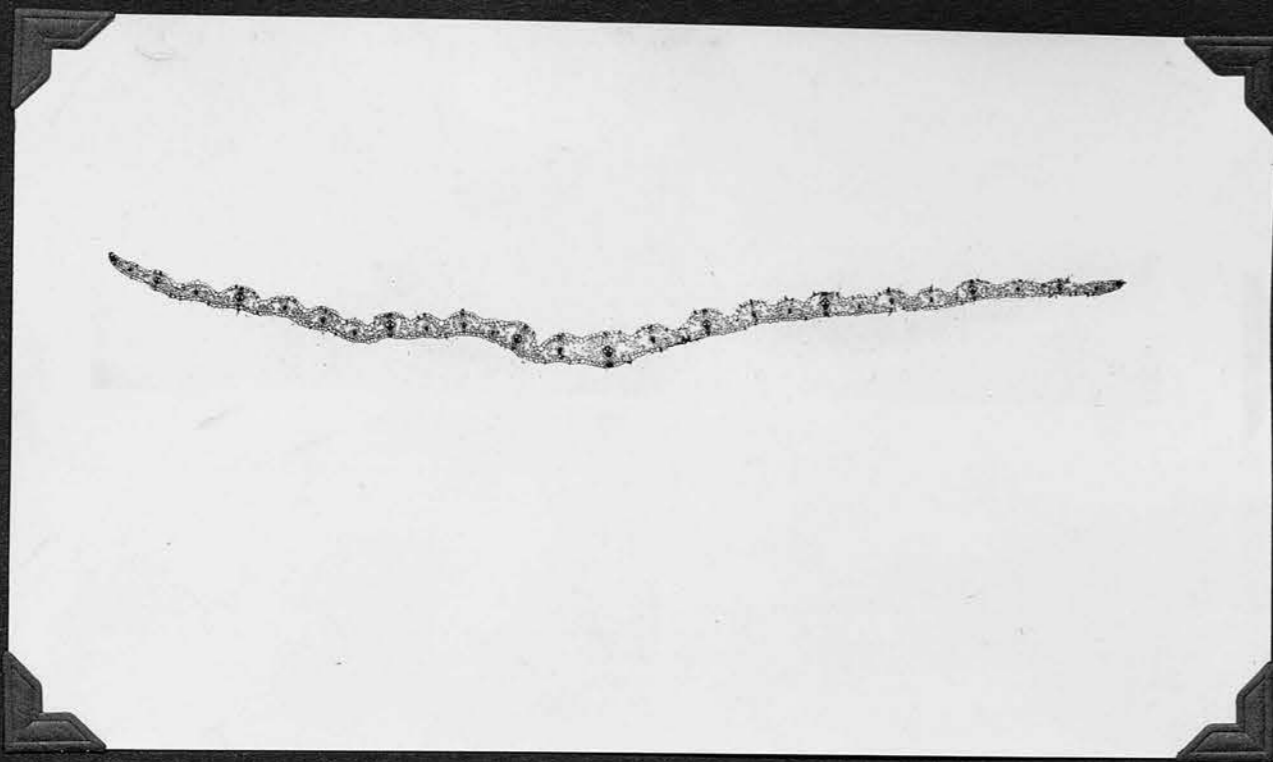
Pl. 87. *Cynodon dactylon* Pers. x 50.



Pl. 88. Arundo phragmites L. x 25.



Pl. 89. Hordeum nodosum L. x 40.



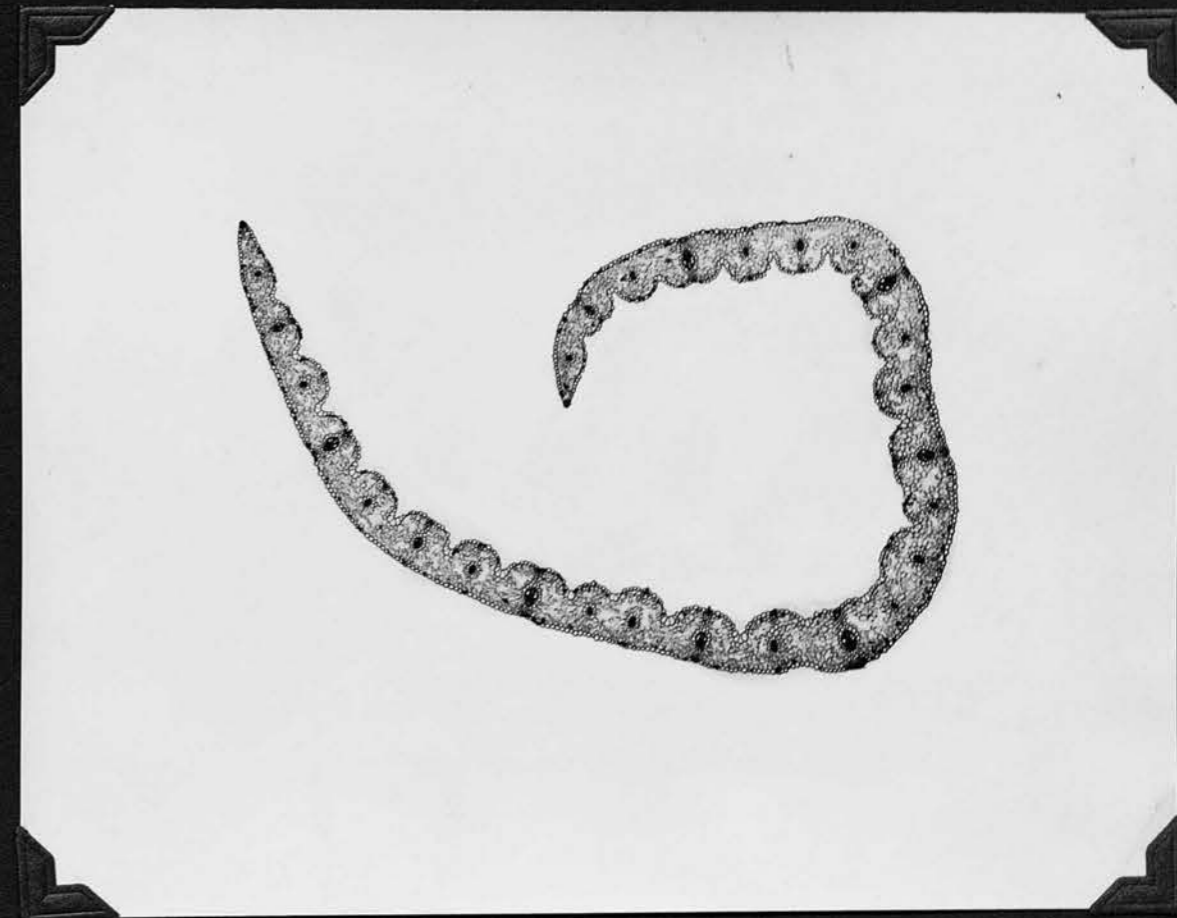
Pl. 90. *Holcus mollis* L. x 20.



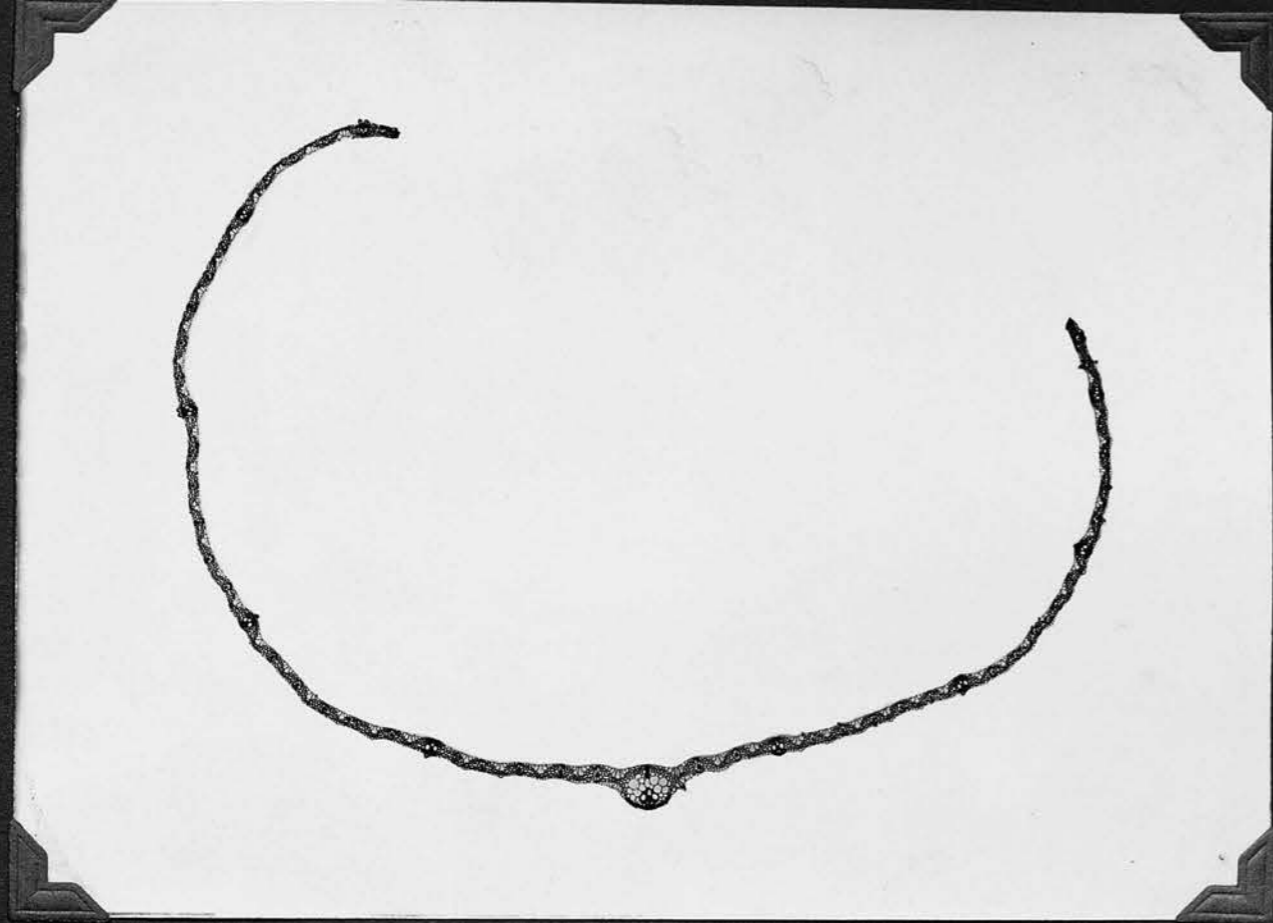
Pl. 91. *Phleum phleoides* Simonk.
x 40.



Pl. 92a. *Phleum alpinum* L. (tetra-
ploid from natural habitat) x 30.



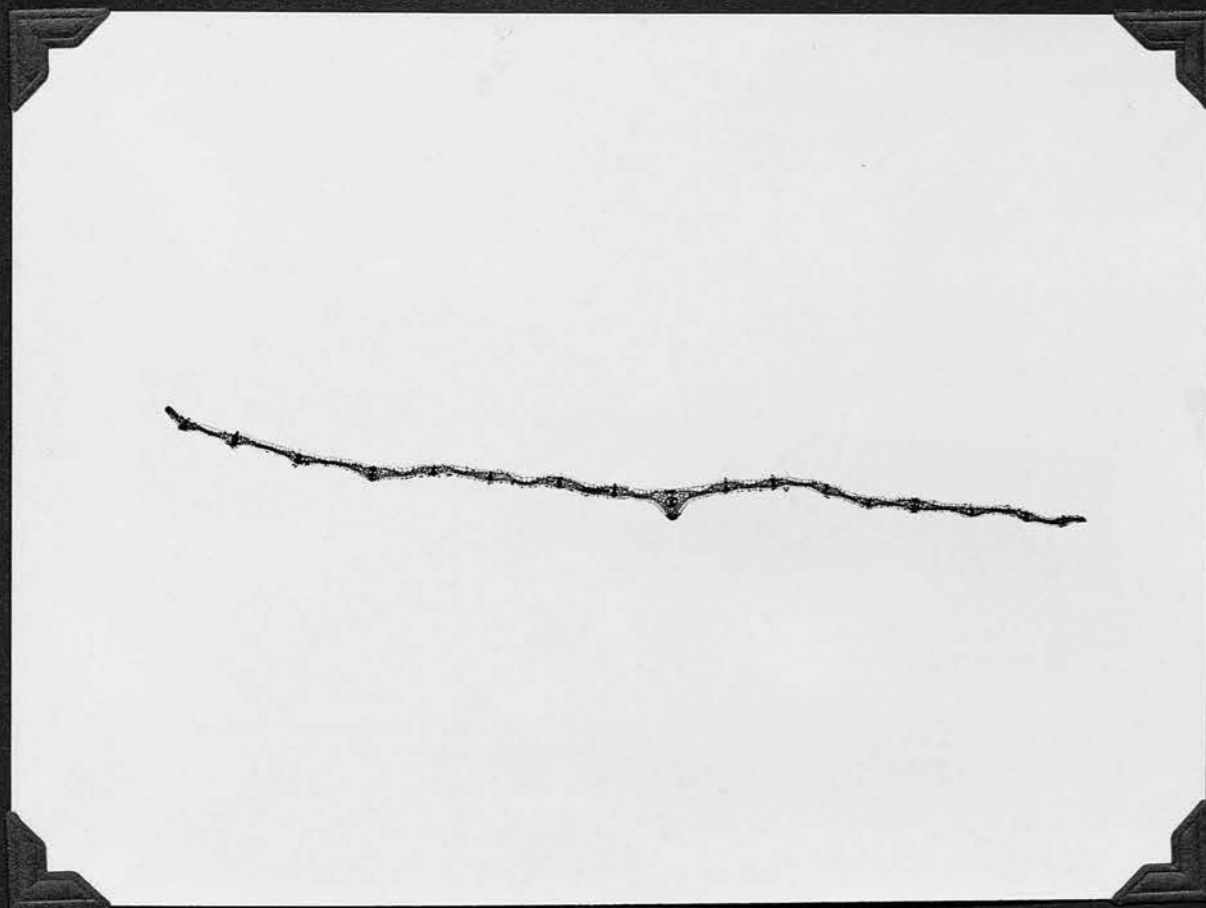
Pl.92b. *Phleum alpinum* L. (tetraploid, cultivated
form) x 30.



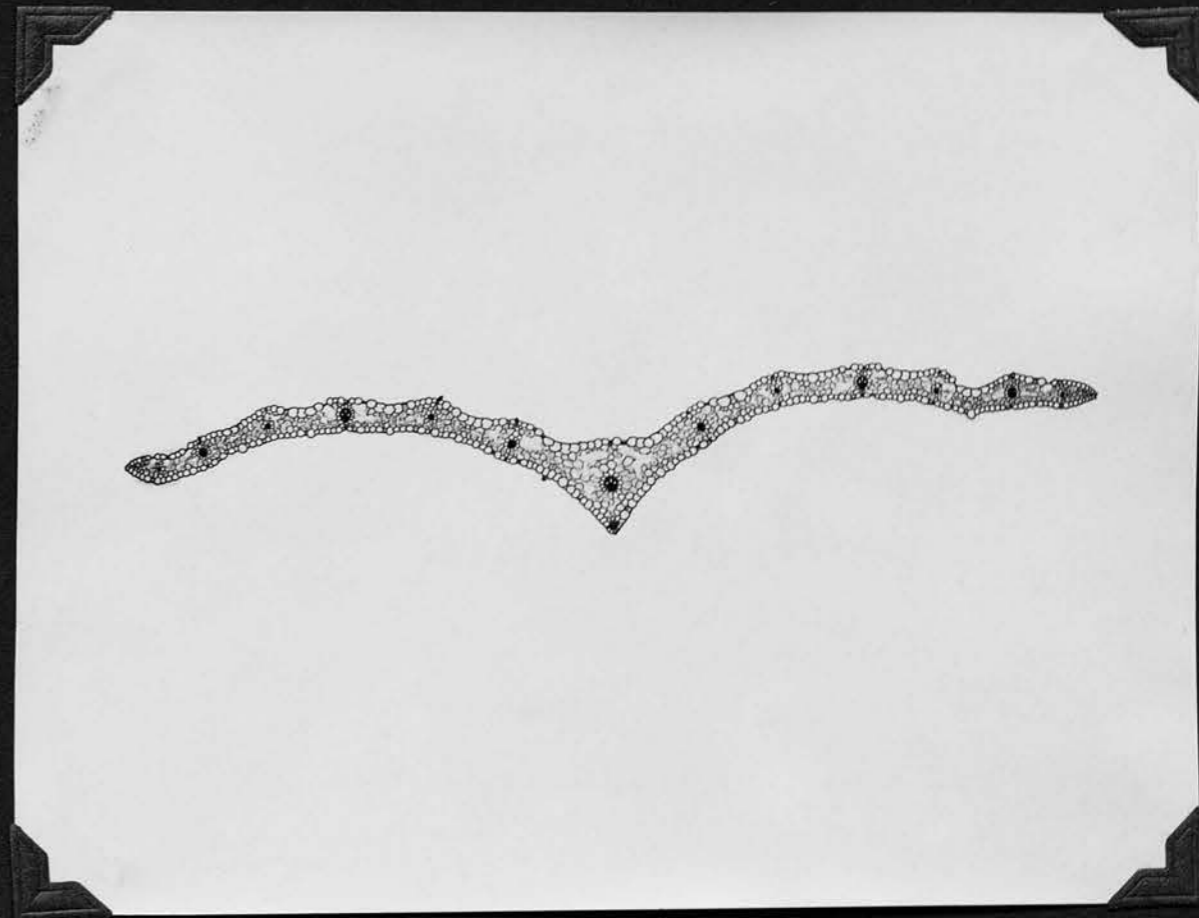
Pl. 93. *Leerzia oryzoides* Sw. x 30.



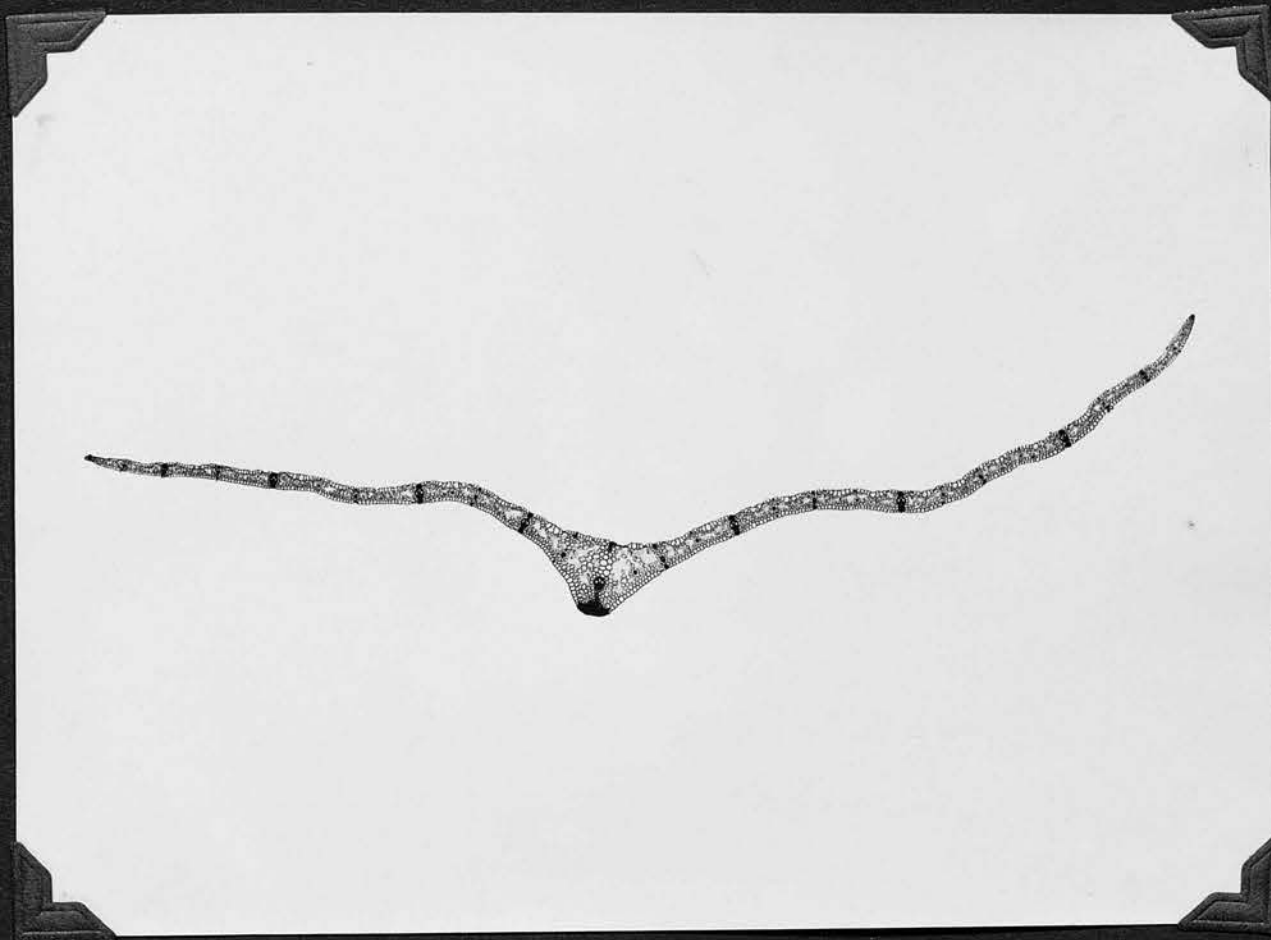
Pl. 94. *Lagurus ovatus* L. x 20.



Pl. 95. *Melica uniflora* Retz. x 30.



Pl. 96. *Cynosurus echinatus* L. x 30.



Pl. 97. *Milium effusum* L. x 20.



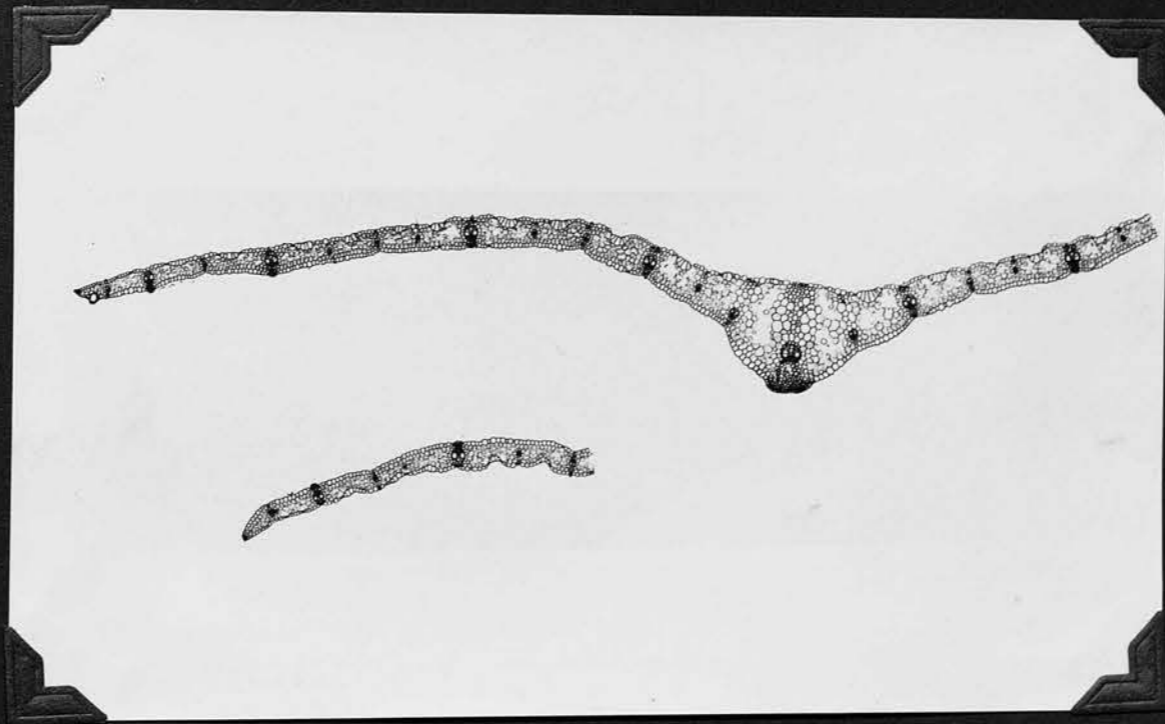
Pl. 98. *Brachypodium sylvaticum* R. & S. x 30.



Pl. 99. *Calamagrostis epigeios* Roth. x 30.



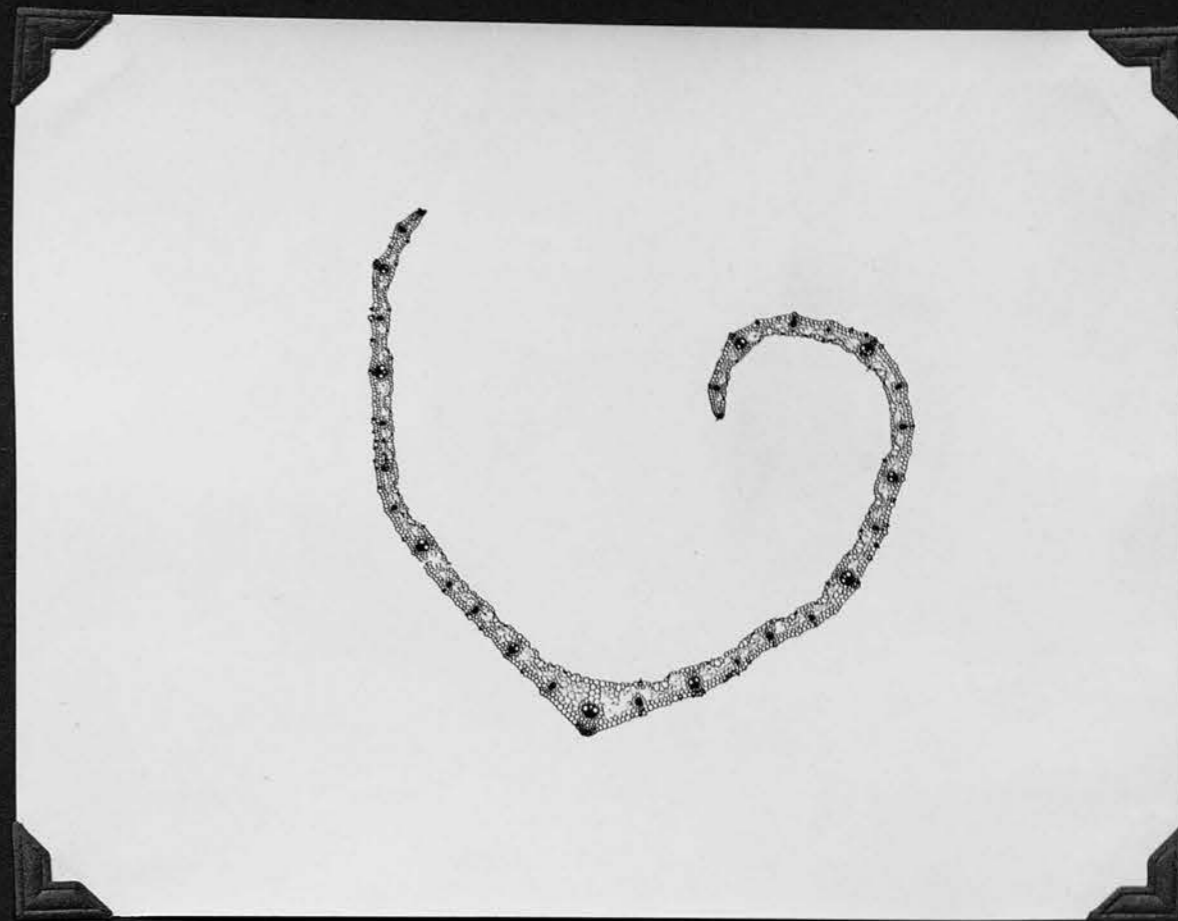
Pl. 100a. *Bromus ramosus* Huds. x 25.



Pl. 100b. *Bromus ramosus* Huds. x 20.



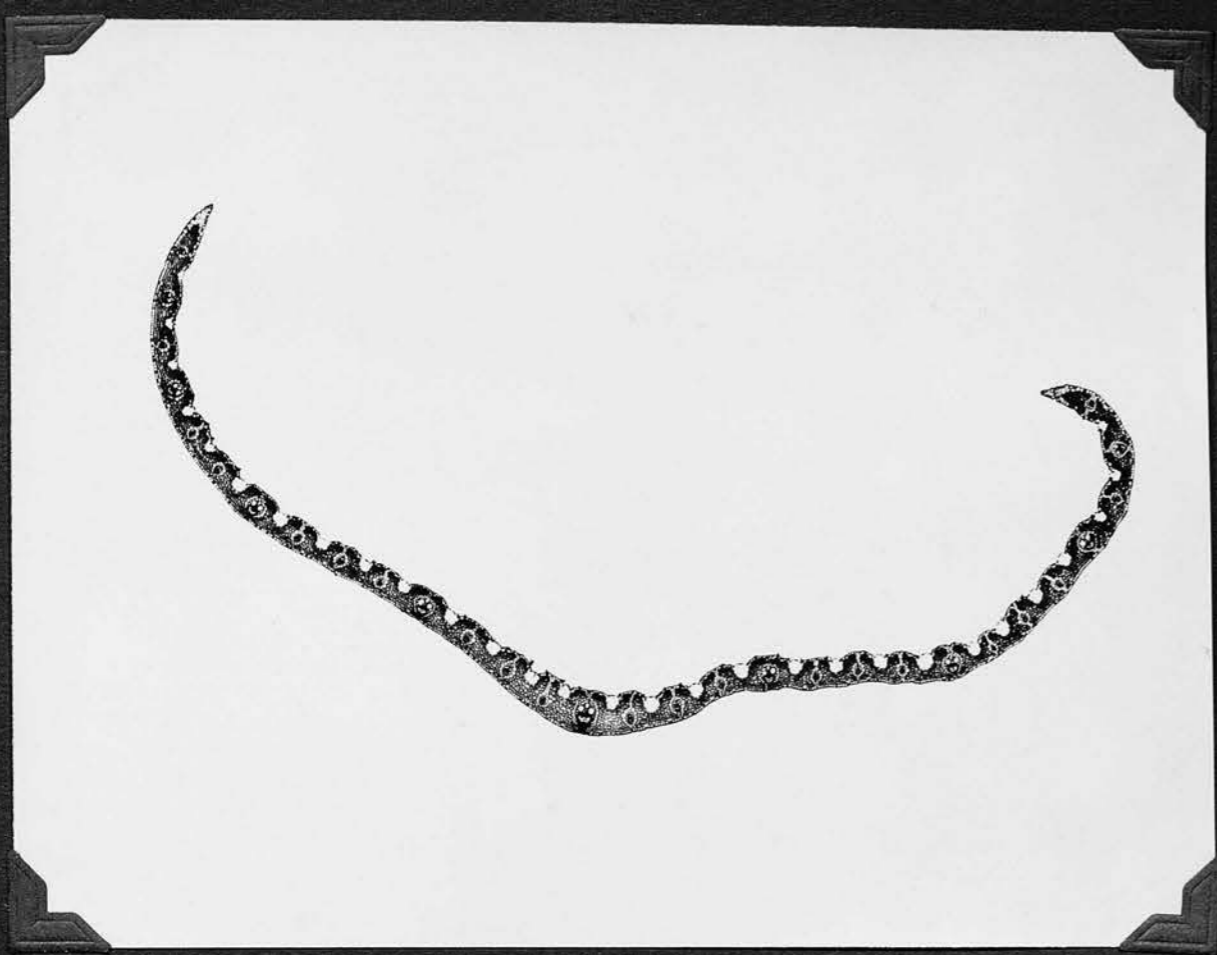
Pl. 101. *Anthoxanthum odoratum* L. x 35.



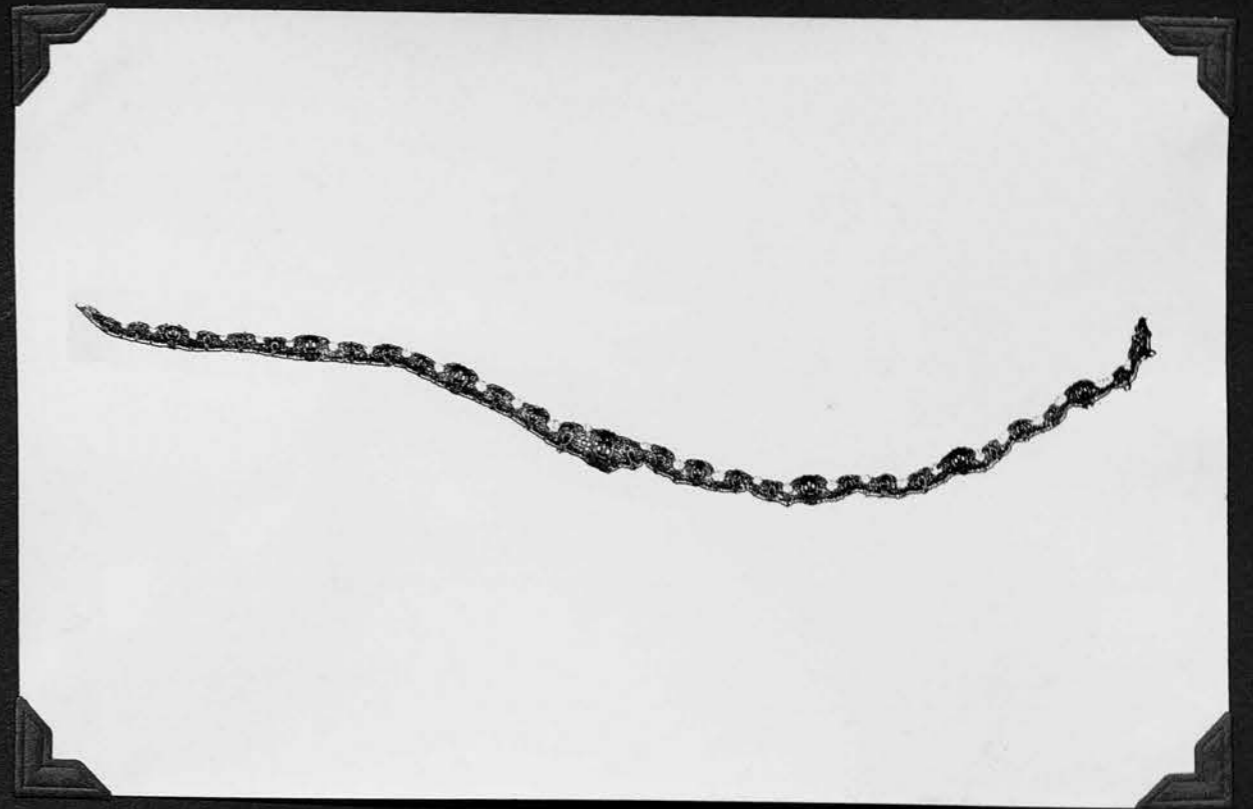
Pl. 102. *Arrhenatherum elatius* M. & K. x 30.



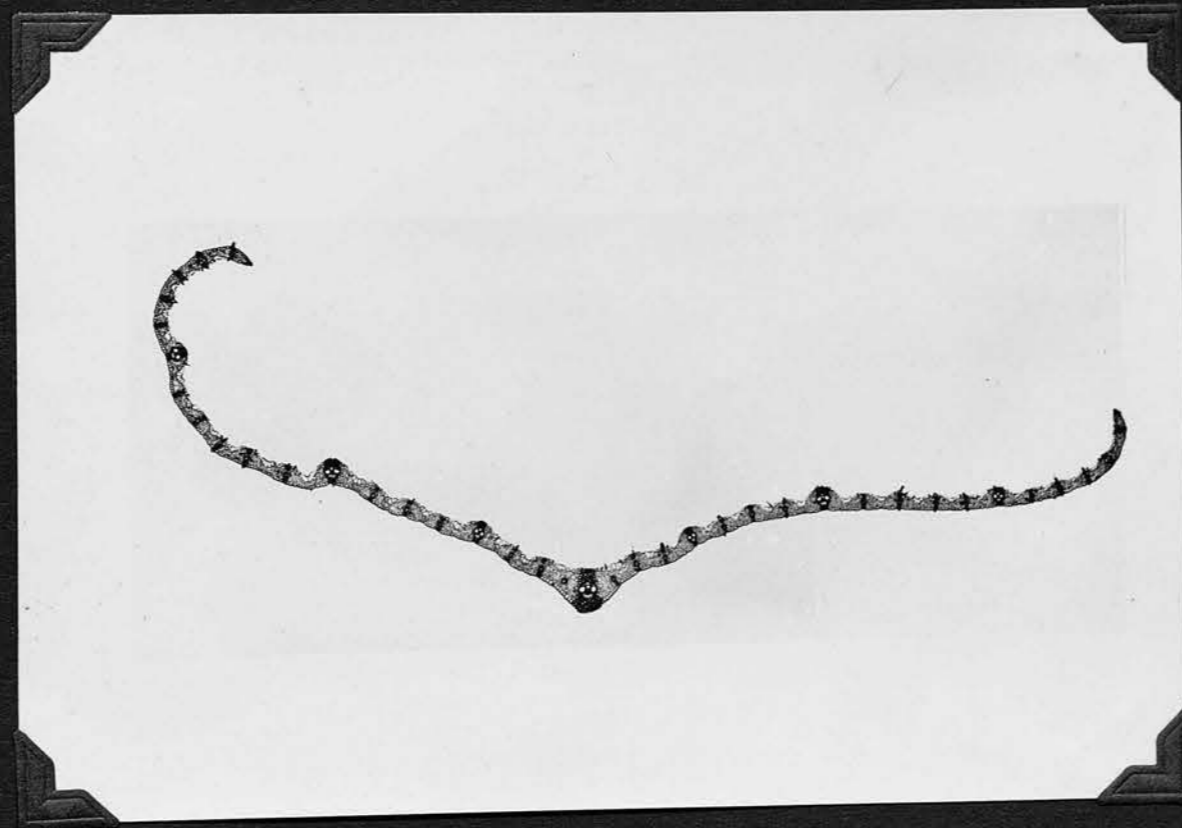
Pl. 103. *Sieglingia decumbens* Bernk.
x 35.



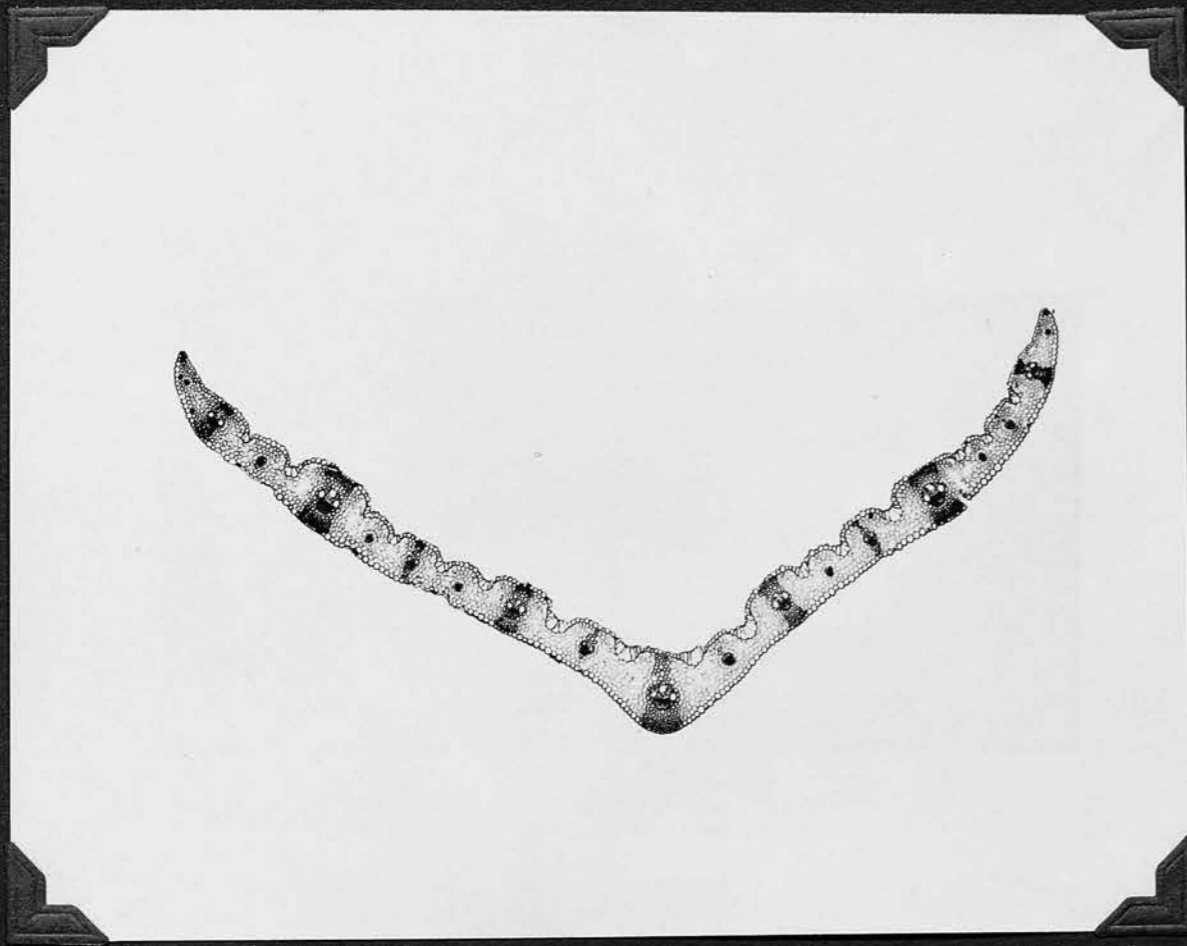
Pl. 104. *Molinia coerulea* Moench. x 35.



Pl. 105. *Calamagrostis epigeios* Roth. x 20.



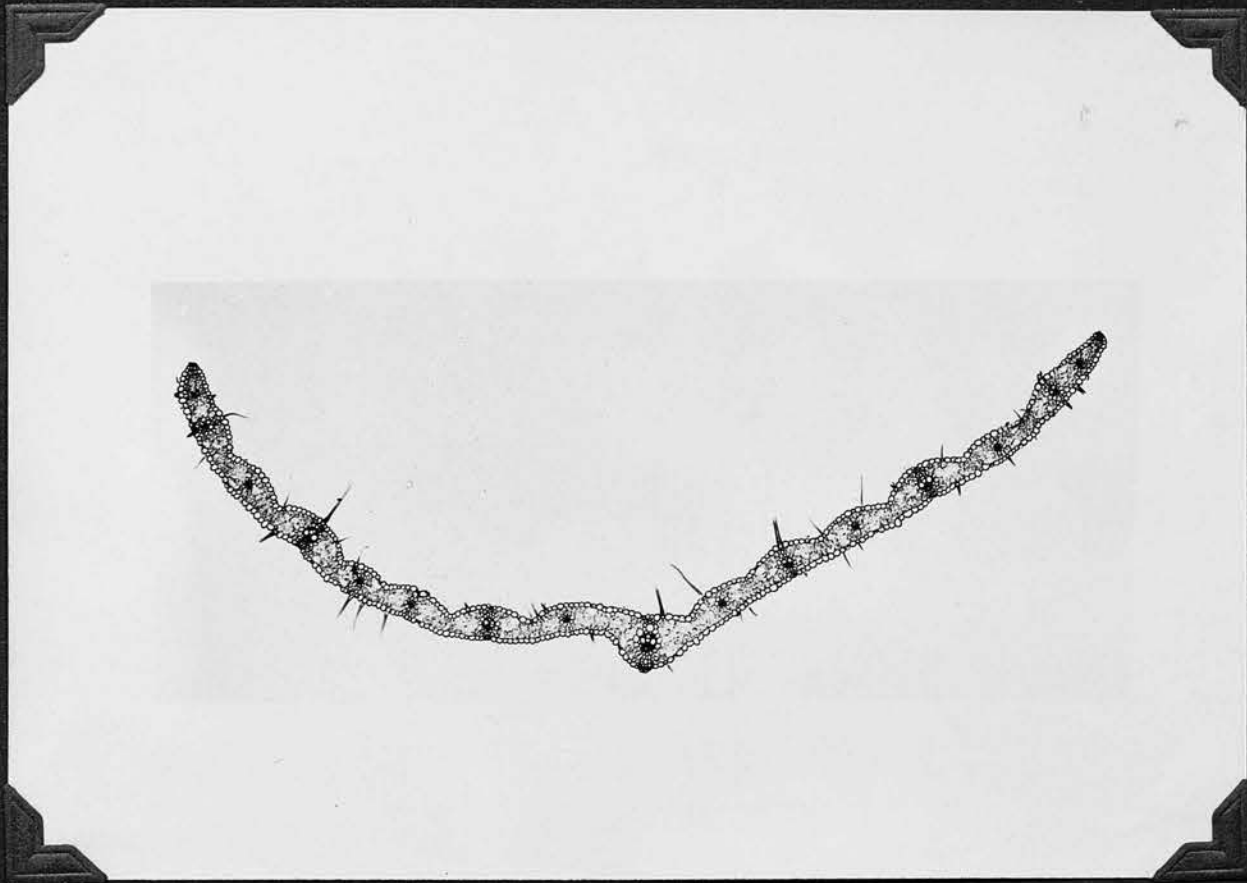
Pl. 106. *Calamagrostis canescens* Gmel. x 30.



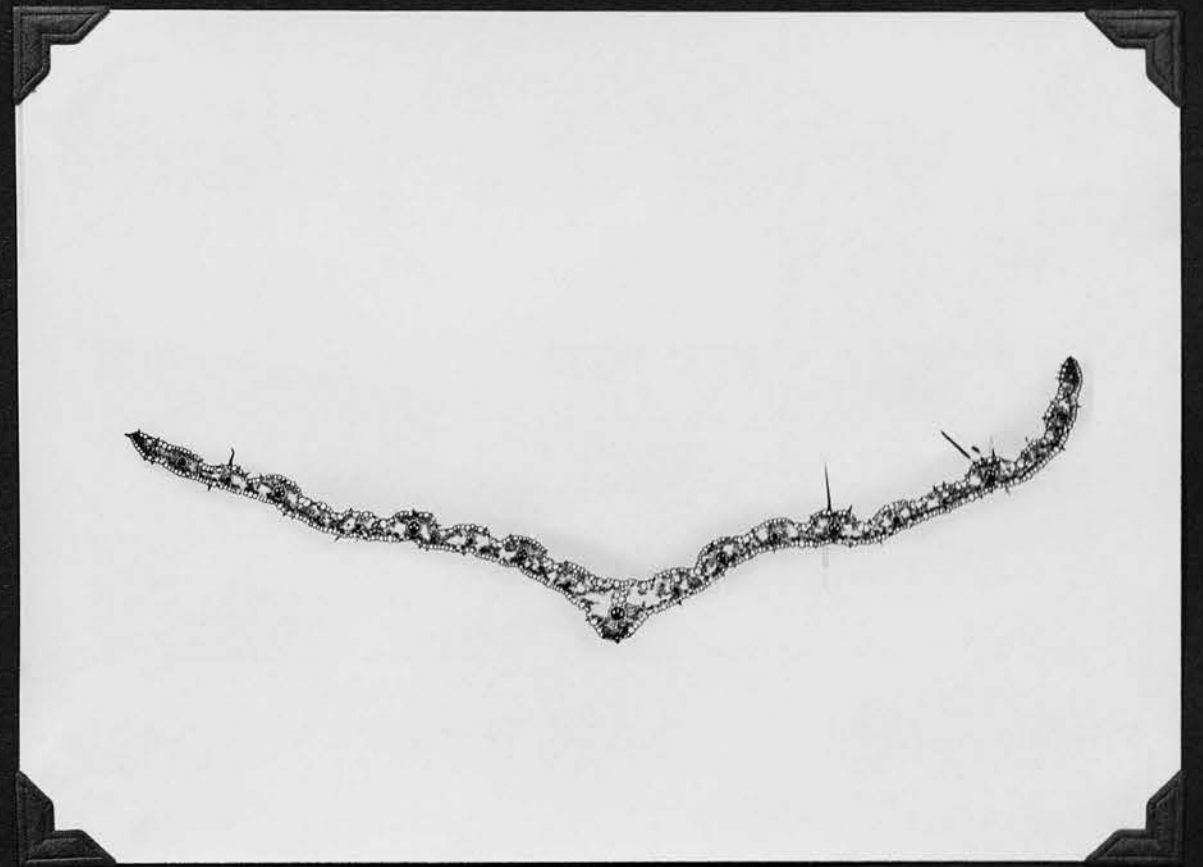
Pl. 107a. Bromus erectus Huds. x 30.



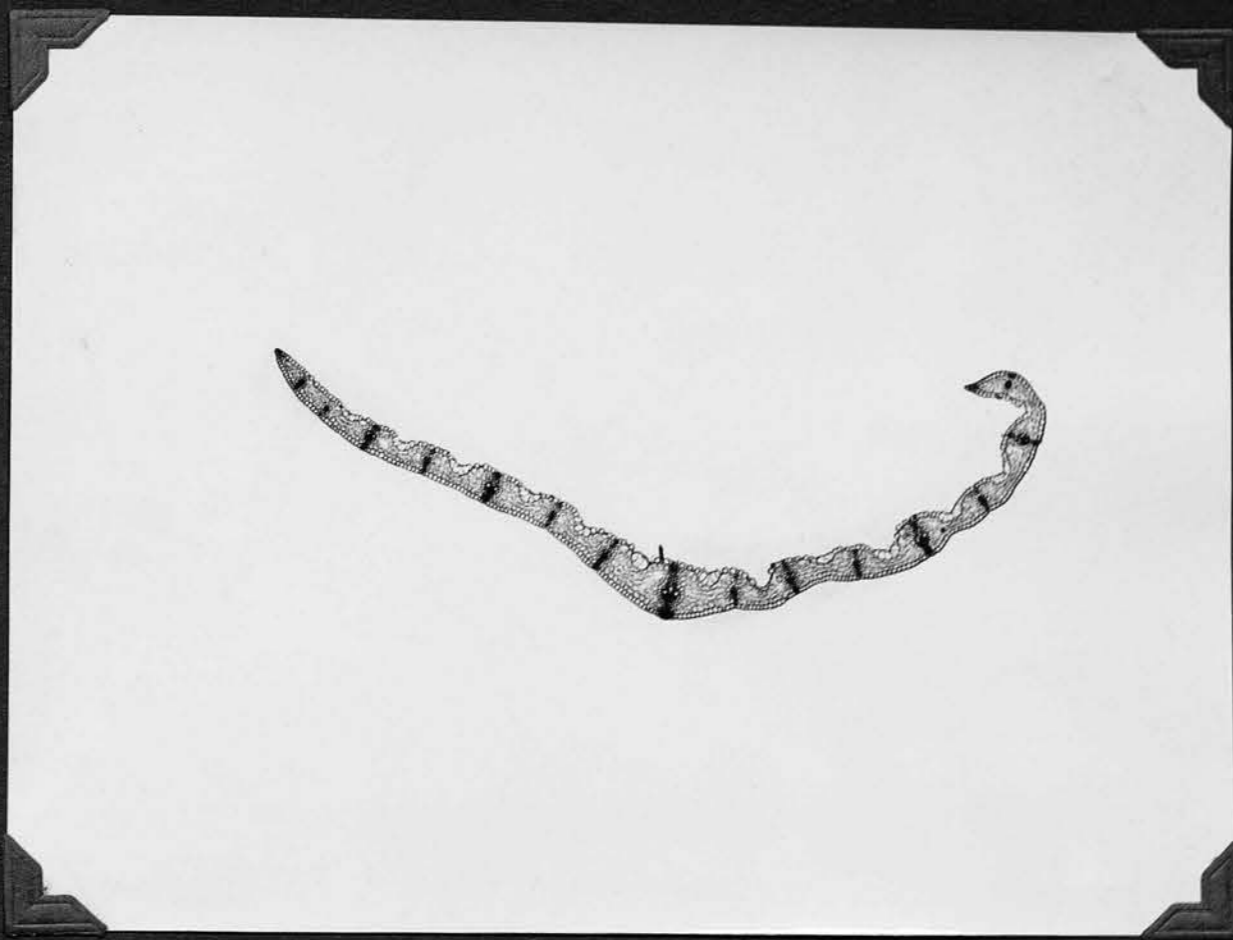
Pl. 107b. Bromus erectus Huds.
(low ribbed form) x 35.



Pl. 108. *Bromus sterilis* L. x 35.



Pl. 109. *Holcus lanatus* L. x 25.



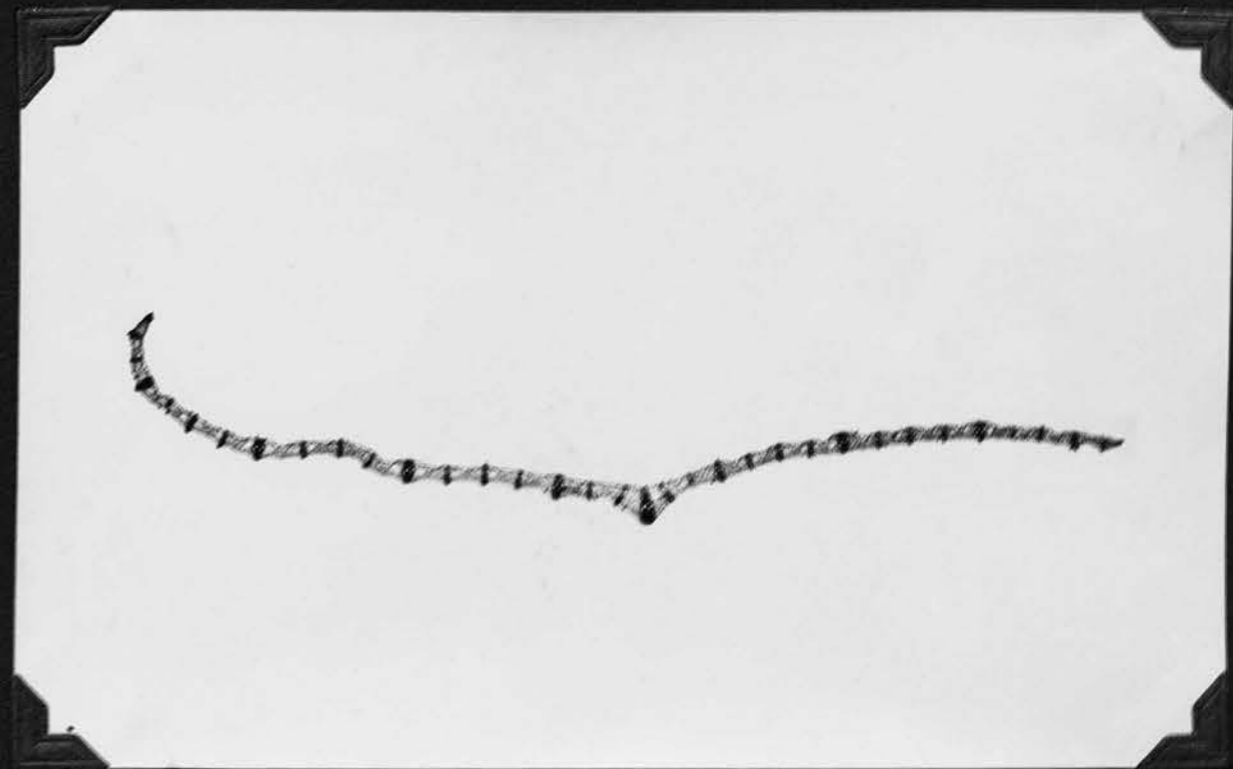
Pl. 110. *Hierochloa odorata* Wahl. x 30.



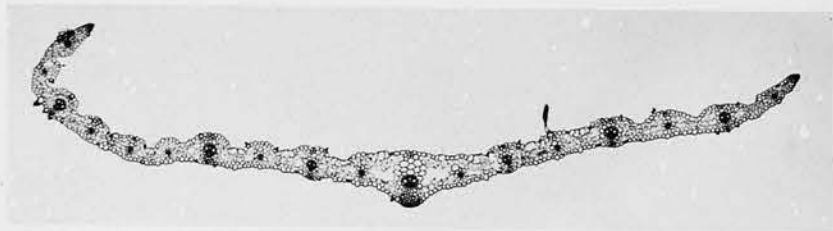
Pl. 111. *Bromus hordeaceus* L. x 30.



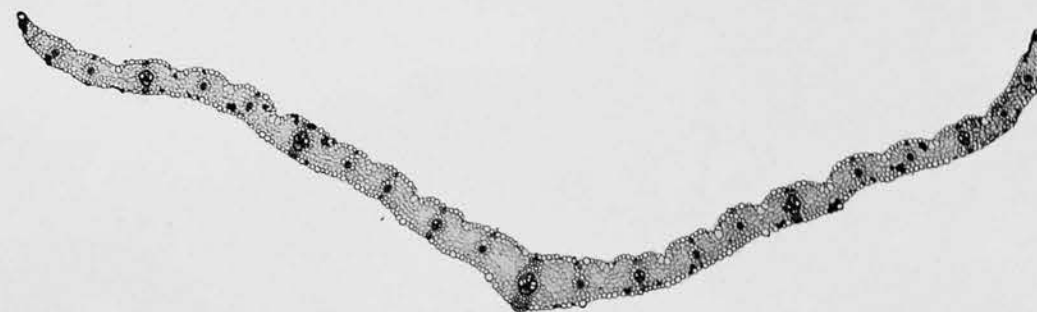
Pl. 112. *Agropyron repens* Beauv. x 20.



Pl. 113. *Agropyron caninum* Beauv. x 20.



Pl. 114. *Hordeum murinum* L. x 30.



Pl. 115. *Phleum pratense* L. (low ribbed form and showing sphaerocrystals of phlein) x 30.



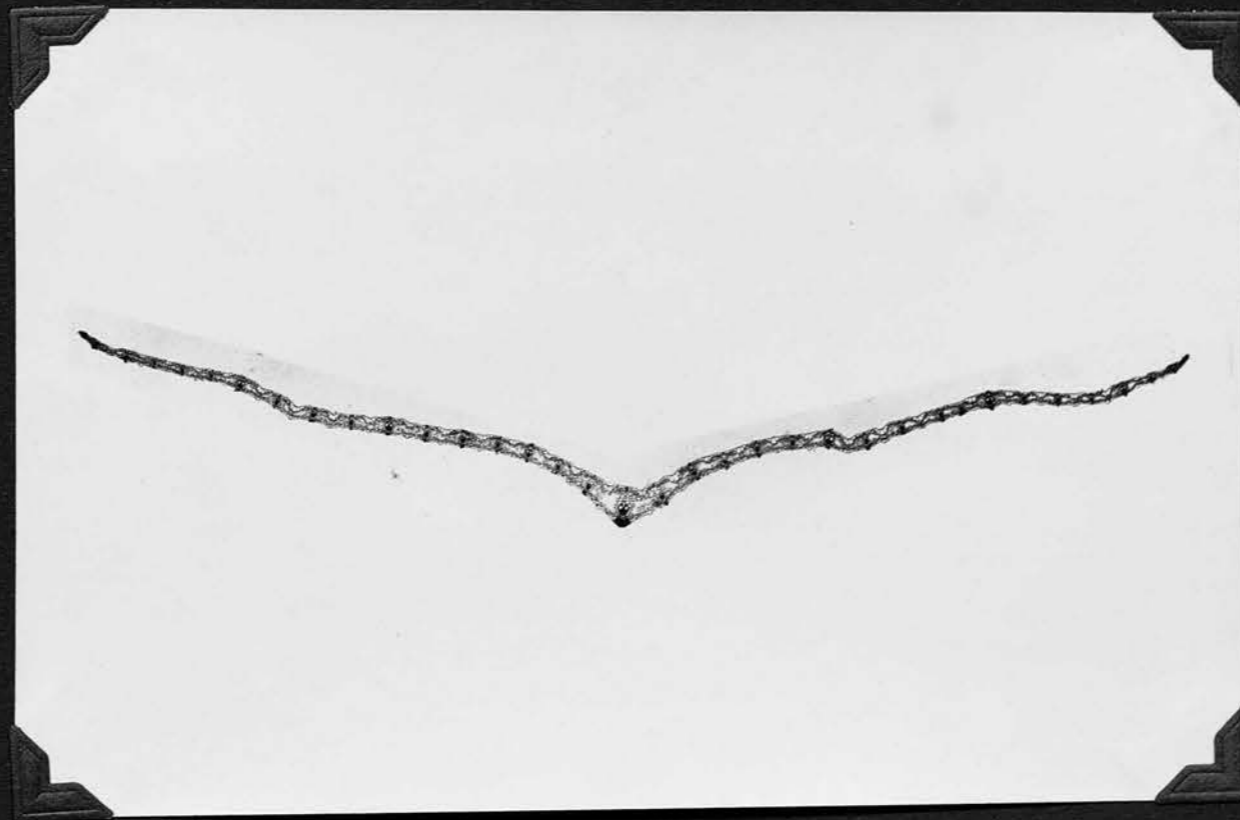
Pl. 116. *Melica nutans* L. x 30.



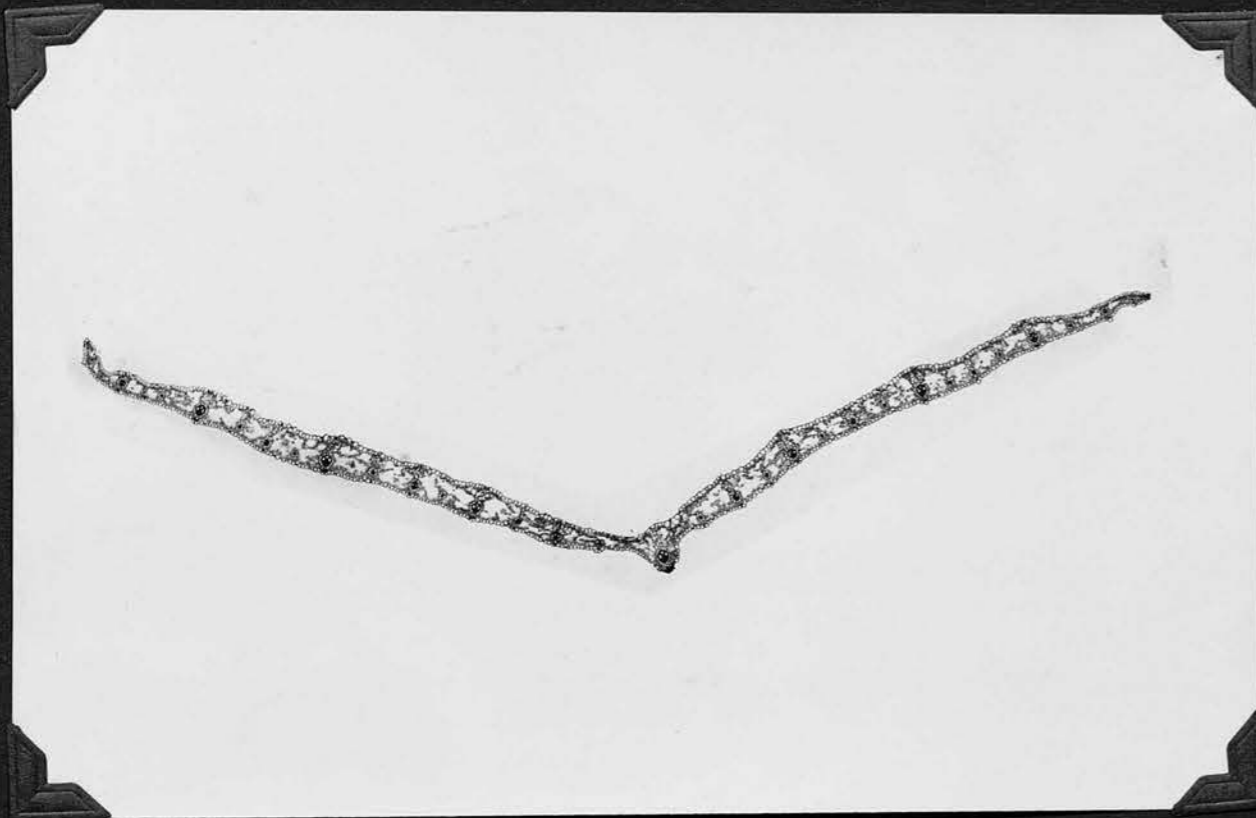
Pl. 117. *Briza media* L. x 30.



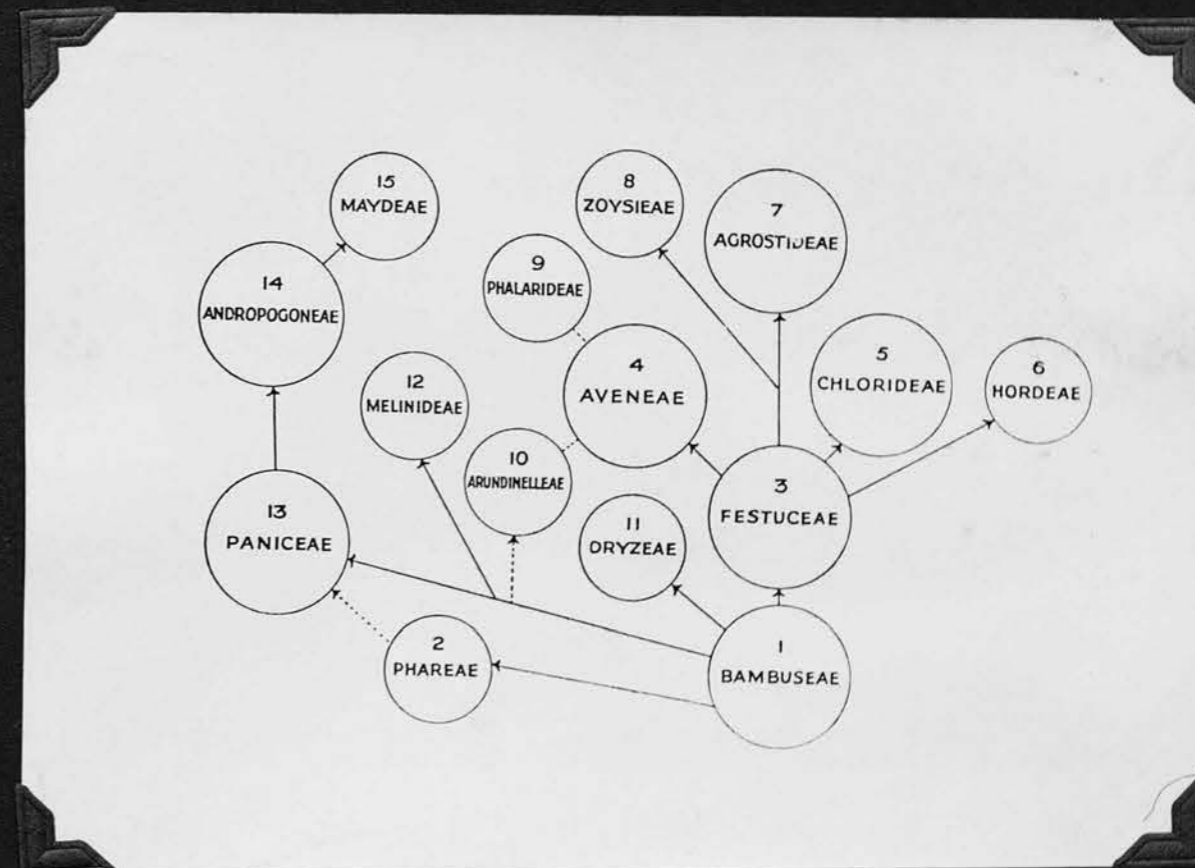
Pl. 118. *Avena fatua* L. x 20.



Pl. 119. *Phalaris arundinacea* x 15.



Pl. 120. *Catabrosa aquatica* Beauv. (showing large irregular air-spaces) x 20.



Pl. 121. Graphical representation of tribal relationships in the Gramineae. (After Bews).