

**CIHM
Microfiche
Series
(Monographs)**

**ICMH
Collection de
microfiches
(monographies)**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1997

The copy filmed here has been reproduced thanks to the generosity of:

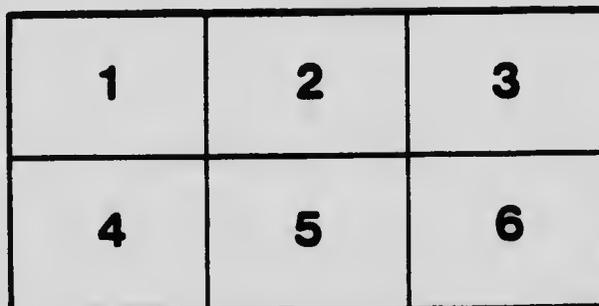
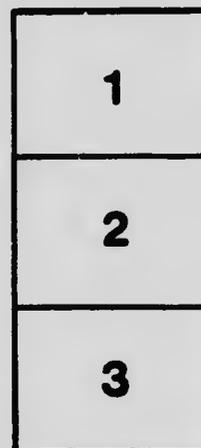
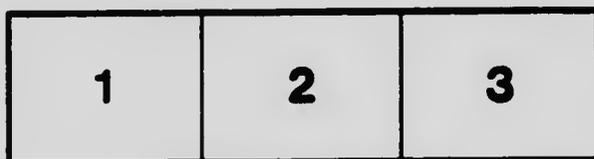
University of Regina

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

University of Regina

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

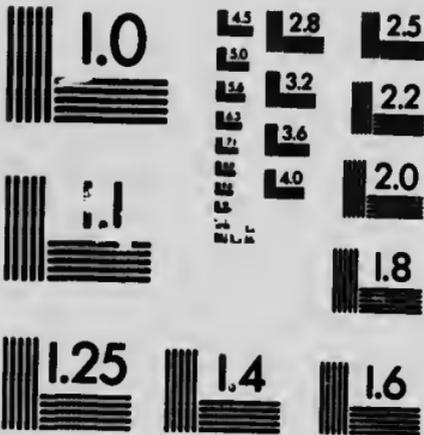
Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaît sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc

1653 East Main Street 14609 USA
Rochester, New York
(716) 482-0300 - Phone
(716) 288-5989 - Fax

**REPORT ON A COLLECTION OF FOSSIL WOODS
FROM THE CRETACEOUS OF ALBERTA.**

BY

D. P. PENHALLOW, D.Sc., F.R.S.C., F.G.S.A.

[Reprinted from **THE OTTAWA NATURALIST**, V. XXII, No. 4, July,
1908, Ottawa, Canada.]



REPORT ON A COLLECTION OF FOSSIL WOODS FROM
THE CRETACEOUS OF ALBERTA.

By D. P. Penhallow, D.Sc., F R.S.C., F.G.S.A.

Early in the present year, Mr. L. M. Lambe, of the Geological Survey, placed in my hands a specimen of fossil wood for determination. It was without number, but it was described as having been collected by Mr. Milliken from the Edmonton Series of the Red Deer River, 100 miles west of Gleichen, Alberta.

At a later date, Mr. Lambe sent me six additional specimens for determination. These were all reported as derived from the Judith River (Belly River) Series of the Red Deer River, Alberta. The catalogue numbers on the specimens correspond to the following general description:—

Nos. 275, 276, 319 and 330—Silicified woods.

No. 838—Silicified wood not determinable in consequence of extended decay and distortion of structure.

No. 1676—A longitudinal section of a cone.

PICEA ALBERTENSIS, N. SP.

The specimen numbered 1676, is a longitudinal section of a cone, the basal portion of which has been removed. As found, it measures 38 mm. in its greatest length, and 18 mm. in its greatest width. The upper end is complete, and the general structure is also intact within the limits of the specimen. The basal portion of the cone appears to have been carried away by fracture of the matrix.

The character of the specimen does not admit of full determination, but the shape immediately suggests comparison with a cone of *Picea*, while both the size and general outline invite comparison with *P. columbiensis*, Penh., recently described as having been obtained by Dr. R. A. Daly from the Tertiary deposits of the Kettle River, B.C.¹ Measurements of the two cones show that the Alberta specimen is slightly narrower, and that about one-fifth of its length has been removed. The correspondence is so close that the two might well be regarded as the same species, but in the absence of external characters, such a correlation would be unsafe, and it seems desirable to designate the cone by a distinctive name, *P. albertensis*, n. sp.

CUPRESSOXYLON MACROCARPOIDES, PENH.

Specimens 319 and 330 proved to be fairly well preserved woods of *Cupressoxylon macrocarpoides*, with which it was possible to compare them without difficulty.

1. Rept. on Foss. Pl. from the Internat. Bound. Surv. for 1903-05. Trans. R.S.C., VIII, 1907, iv.

This is a species originally described from the Cretaceous of Medicine Hat, Alberta, but which has more recently been found in the Tertiary of Kettle River, near Midway, B.C.² Its present occurrence in the Edmonton Series is, therefore, fully in accord with its previously known distribution.

SEQUOIA ALBERTENSIS, N. SP.

The unnumbered specimen from the Edmonton Series represents a wood which is exceedingly well preserved in many portions, and admits of a detailed diagnosis. It is therefore taken as the type to which specimens 275 and 276 also belong, and they all clearly represent the same species of *Sequoia*. The diagnosis is as follows:—

SEQUOIA ALBERTENSIS, N. SP.

Transverse.—Growth rings variable; the summer wood dense, sometimes rather open and occasionally double, the transition from the spring wood rather abrupt; spring wood open, the tracheids thin-walled, large, distinctly squarish-hexagonal and often much elongated radially. Resin cells scattering, sometimes rather numerous throughout, but especially dominant in the summer wood. Medullary rays *distant 2-8, more rarely 10 rows of tracheids*. Tracheids rather uniform, sometimes in irregular rows in the summer wood.

Radial.—Ray cells straight or more often contracted at the ends, equal to about 4 spring tracheids; the upper and lower walls rather thick, entire or sparingly pitted; the terminal walls rather thin, not pitted; the lateral walls with oval, conspicuously bordered pits, the broadly lenticular orifice usually diagonal to the cell axis, at first 1 or 2, at length becoming 1 per tracheid in the summer wood. Bordered pits large, numerous, round or oval, commonly in two rows in the earlier spring wood. Pits on the tangential walls of the summer tracheids numerous and prominent and large, but rather narrowly lenticular. Resin cells numerous, resinous.

Tangential.—Medullary rays numerous, often upwards of 54 cells high, frequently more or less two-rowed. Cells frequently very resinous, oval or squarish, sometimes oblong, but chiefly uniform and equal throughout.

A comparison of these woods with that of the existing *S. sempervirens*, or red-wood, shows most interesting and very close relations. In the diagnosis of *S. albertensis*, certain of the structural details are given in *italics*. These indicate the respects in which there is an essential difference between it and *S. sempervirens*. In all other features the two woods are

². *Ibid.*

essentially identical, and one might well be led, at first, to question if they are not, after all, only one form of the same species. But the number of pits which characterize the radial walls of the ray cells, the number of rows of pits on the radial walls of the tracheids, and the size and form of the pits on the tangential walls of the summer tracheids, point with certainty to specific differences, and the fossil is, therefore, described under a new name, for which purpose that of the province seems to be appropriate.

GENERAL CONCLUSIONS.

The character of the material discussed in the foregoing studies, leaves very little room for any conclusions which would be of value in stratigraphical determinations.

The specimen of *Picea* offers only one of a very few examples of the occurrence of cones of this genus in Cretaceous deposits. Berry has recently shown the existence of beautifully preserved cones of *Picea cliffwoodensis* in the Upper Cretaceous of New Jersey.¹ These he regards as comparable with the cones of *P. excelsa*. They, however, offer no points of comparison with *P. albertensis*, inasmuch as they are much larger and more linear-oblong.

As already noted, Penhallow has recorded the sparing occurrence of cones of *P. columbiensis* in the Tertiary of Kettle River, British Columbia. Knowlton has found cones of *P. harimani*² in the Upper Eocene of Kukak Bay, Alaska, a form which is in no sense comparable with *P. albertensis*, though it presents many features strikingly similar to those of *P. cliffwoodensis*.

It may be recalled in this connection, that the foliage of what are at present regarded as distinct species—*P. tranquillensis*, Penh., and *P. quilchensis*, Penh.,³—has been obtained from the Tertiary of the Tranquille River and from Quilchena, B.C., and there is no present evidence to show that the more recently observed cone from the Cretaceous of Alberta, is not related to one of them, rather than to *P. columbiensis*. If these two were to be regarded as specifically identical, it would be possible to recognize a wider geological range for the species than has heretofore been known; but in the absence of external characters in the Alberta specimen, such a correlation would be unsafe.

Cupressoxylon macrocarpoides, Penh., has been determined on previous occasions, to be common to both the Tertiary and Cretaceous,⁴ and its present occurrence in Cretaceous deposits,

1. The Flora of the Cliffwood Clays. Geol. Surv. N.J., 1905.
2. Fossil Plants from Kukak Bay. Harriman Expd., 1904, iv, 150.
3. Report on the Tertiary Flora of British Columbia. Geol. Surv. Can., Monogr. 1908.
4. N. A. Gymnosperms. Penhallow, 238.

cannot be regarded as having any special stratigraphical significance.

As bearing upon the present studies, it is worthy of note that, in his discussion of the Flora of the Judith River beds, Knowlton records at least three species of *Sequoia*.⁵ Two of these are represented by foliage and small branches only. *S. reichenbachii* (Geinitz) Heer, is known to extend from the Dakota formation to the Belly River Series, in which it is found in Canada. *S. heterophylla* is a well known Cretaceous form of both Europe and America, and in the latter it ranges from the Later Potomac to the Willow Creek Series.

The third species is represented by a cone only, as obtained from the Judith River beds ten miles north of Wild Horse Lake, Alberta. This species, which Knowlton does not distinguish by a specific name, he nevertheless finds to be very near to *S. heerii*, Lesq., although it likewise greatly resembles certain cones of *S. reichenbachii* from the Kome beds of Greenland, as described by Heer. It may be the fruit of the wood now under discussion. It is, however, impossible to correlate these isolated specimens more completely at this time.

From the brief survey of the material thus presented, it is clear that the different species possess no special value for stratigraphical purposes, but they do extend our knowledge of their geological range and geographical distribution in important and interesting ways.

5. Geol. & Pal. Judith River Beds. U. S. Geol. Surv., Bull. 257, 1905, 131-132.

DESCRIPTION OF FIGURES.

SEQUOIA ALBERTENSIS N. SP.

- Fig. 1. Transverse section showing the general character of the structure. x 52.
- Fig. 2. Transverse section showing the double summer wood of the broader growth rings. x 52.
- Fig. 3. Tangential section showing the character of the medullary rays. x 52.
- Fig. 4. Radial section of a medullary ray, showing character and numbers of pits. x 227.5.
- Fig. 5. Radial section showing the two-seriate bordered pits of the spring tracheids. x 227.5.
- Fig. 6. Radial section showing the number and position of bordered pits on the tangential walls of the summer wood.

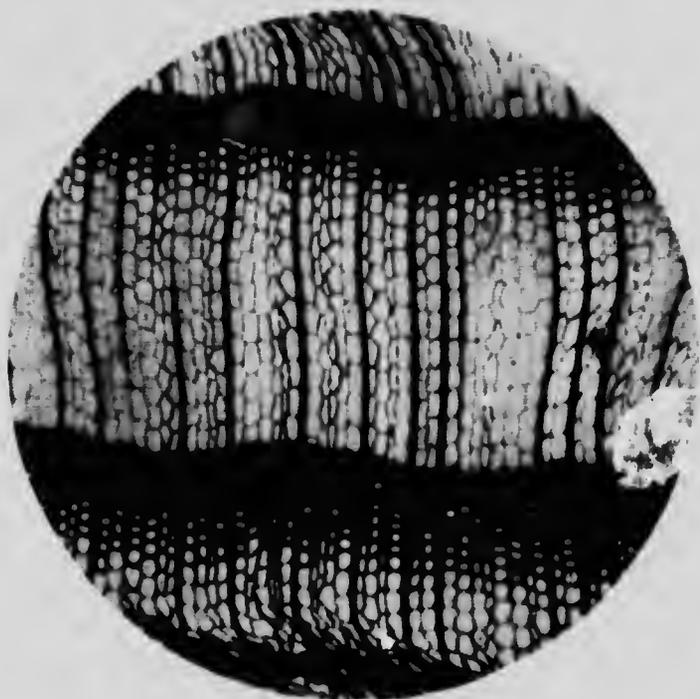


Fig. 1

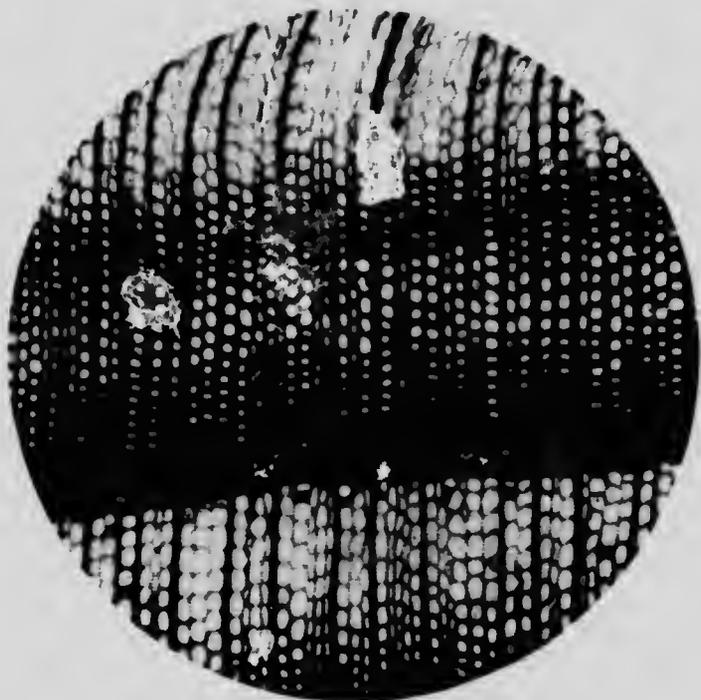


Fig. 2



Fig. 3

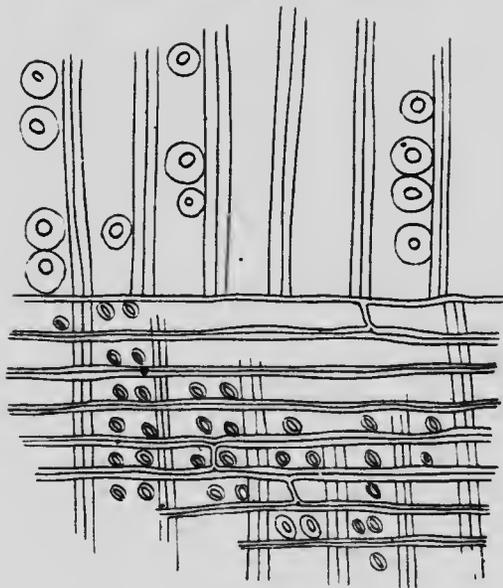


Fig. 4

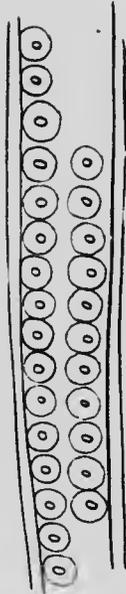


Fig. 5

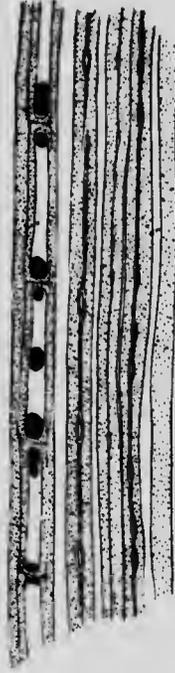


Fig. 6

