

# ON PSEUDOLARIX KAEMPFERI GORD. FROM THE CLAY OF REUVER

by

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(With two plates).

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Engaged in a study of the fossiliferous layers on German territory near the Dutch village Reuver in the province of Limburg, I felt my admiration grow more and more for the eminent work of Cl. and E. M. Reid "The pliocene floras of the Dutch-Prussian border" (Mededeelingen van de Rijksopsporing van Delfstoffen N<sup>o</sup>. 6; the Hague 1915).

The thoroughness with which the authors dealt with their subject is really admirable. I was therefore surprised and delighted to find in those layers a fossil, not described in their work.

I met with some scales that obviously had belonged to a cone with deciduous scales from a coniferous tree, as I found separate ones only. Considering that fact, the group of recent Coniferae, to which the fossils could be allied, was much reduced. In the end I was obliged to confine my attention to the genus *Pseudolarix*. A comparison with the scales of recent cones from the dendrological herbarium of the Agricultural University at Wageningen did not produce, not even in microscopical details, divergent points, lying outside the normal variability.

As I can in no way distinguish the fossil remains from the corresponding parts of the recent species, I identify

them with the only known living species *Pseudolarix Kaempferi* Gord.

Plate I illustrates the internal sides which carried the seeds of fossil (figures 3, 4 and 5) and recent (figures 6 and 7) scales, the external sides with the small bracts of both fossil (figures 1 and 2) and recent (figures 8 and 9) scales and the finely-striated external surface of a fossil (figure 10) and of a recent (figure 11) scale. \*)

On comparing the fossil with the recent specimens one must bear in mind that the former have been exposed to the pressure of a burden of clay, sand and gravel, sufficient to reduce trunks of some decimetres thickness to "boards" of but a few centimetres.

Though Cl. and E. M. Reid on describing the Reuverian fossil flora do not mention *Pseudolarix*, they yet discovered another part probably of the same tree which however they did not recognize as such. They give an illustration of a fossil which they interpret as a portion of the male inflorescence of a variety of *Gnetum scandens* Roxb. (pages 55 and 56 and plate XX, figure 27, of the above-mentioned work).

In my humble opinion it is more probably a dwarf-shoot of *Pseudolarix*.

In support of this view, I may be allowed to refer to plate II, showing the original fossil, found by Mr. and Mrs. Reid (figure 1), a dwarf-shoot of *Pseudolarix Kaempferi* Gord. (figure 3), a portion of a male inflorescence of *Gnetum scandens* Roxb. (figure 2) and details of the same parts (figures 4, 5 and 6). \*\*) Special attention must be given to

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\*) I am indebted to Mr. C. Coolhaas l.i. of the Agricultural University at Wageningen for the photographs.

\*\*) Dr. P. Tesch m.i., Director of the State Geological Service at Haarlem, kindly allowed the examination and photographic reproduction of the fossil, found by Cl. and E. M. Reid. The figures of *Gnetum* represent a specimen from the State Herbarium at Leiden.

the rows of leaf-bases, bearing the typical leaf-scars, which alternate with ranges of scales.

The monotypic genus *Pseudolarix* nowadays is confined to a restricted region in eastern China (the provinces Kiangsi and Chekiang), where Robert Fortune discovered it in the middle of last century. There it grows in the mountains at an altitude of about 1000 metres. <sup>1)</sup> It reaches the western limits of its distribution on the Lushan mountain-range in the Kiangsi province, where it is already rare. From this point it extends eastward to the neighbourhood of Ningpo near the East China Sea. <sup>2)</sup>

The find of the fossil *Pseudolarix* is a new support for the opinion that there is a relation between the extinct Reuverian and the living Chinese floras. The English authors demonstrated the close relationship with the mountain-flora of western China. To this is now added an alliance with the flora of the east-Chinese highland.

Soon after his discovery Fortune imported *Pseudolarix Kaempferi* into Europe. In the Netherlands it belongs to the perfectly hardy Coniferae; the elder trees regularly yield cones.

This can easily be understood, if we consider the following climatological data.

a. Gemert (about 40 kilometres northwest from Reuver); latitude 51°; 18 metres above sealevel.

Mean temperature in degrees Celsius. <sup>3)</sup>

|          |     |
|----------|-----|
| January  | 2   |
| April    | 10  |
| July     | 19  |
| October  | 10  |
| The year | 10. |

b. Kiukiang (at the foot of the Lushan range); latitude 30°; 45 metres above sealevel.

Mean temperature in degrees Celsius. <sup>4)</sup>

|          |     |
|----------|-----|
| January  | 4   |
| April    | 17  |
| July     | 28  |
| October  | 18  |
| The year | 16. |

c. Lushan mountain-range, where *Pseudolarix* grows at an altitude of about 1000 metres; latitude 30°; mean temperatures deduced from those of Kiukiang with a gradient of 1/2° C. per 100 metres.

Mean temperature in degrees Celsius.

|          |     |
|----------|-----|
| January  | -1  |
| April    | 12  |
| July     | 23  |
| October  | 13  |
| The year | 11. |

In the report of a journey in search of *Pseudolarix* Robert Fortune gives some idea of the climatological conditions under which that tree grows in eastern China. In the autumn of 1854 he found it at an altitude of about 1000 metres in the western part of the Chekiang province. There the air was "most piercingly cold, although it was only in the middle of October and hot enough in the plains in the day time." <sup>5)</sup> On his way to its habitat he passed through a wood of bamboos and through "dense woods of *Cryptomeria*, *Cunninghamia lanceolata*, Oaks, Chestnuts, and such like representatives of a cold or temperate climate." <sup>6)</sup>

Although Reuver probably was not reached by the land-ice, a fall of temperature may have caused the extermination of *Pseudolarix* in that region. Nevertheless we must not forget that edaphic circumstances in the time, when Rhine and Maas built up the pleistocene part of their delta, were not quite favourable for woody plants either.

*Velp (G.), Holland, October 1925.*

**Literature.**

- 1) L. H. Bailey: The cultivated evergreens. London 1923. P. 288.
- 2) *Plantae Wilsonianae*: an enumeration of the woody plants, collected in Western China for the Arnold Arboretum of Harvard University during the years 1907, 1908 and 1909 by E. H. Wilson; edited by Ch. S. Sargent. Cambridge 1914. Volume II, part I, p. 22.
- 3) Monthly Weather Reviews of the Royal Dutch Meteorological Institute 1924.
- 4) W. Patschke: Ueber die extratropischen ostasiatischen Coniferen und ihre Bedeutung für die pflanzengeographische Gliederung Ostasiens. Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie, herausgegeben von A. Engler; 48er Band. Leipzig 1913. P. 728.
- 5) Leaves from my Chinese Note-Book; N<sup>o</sup>. 8; a Journey in search of a new Cedar or *Larix* called *Abies Kaempferi*. The Gardeners' Chronicle 1855, p. 242.

## Explanation of the plates.

### Plate I.

#### *Pseudolarix Kaempferi* Gord.

- Fig. 1. Fossil scale of cone, external side with the bract.  $7/4$ .  
„ 2. Fossil scale of cone, external side.  $3/2$ .  
„ 3. Fossil scale of cone, internal side.  $7/4$ .  
„ 4. Fossil scale of cone, internal side.  $8/5$ .  
„ 5. Fossil scale of cone, internal side.  $7/5$ .  
„ 6. Recent scale of cone, internal side.  $7/5$ .  
„ 7. Recent scale of cone, internal side.  $13/9$ .  
„ 8. Recent scale of cone, external side with the bract.  $14/9$ .  
„ 9. Recent scale of cone, external side with the bract.  $7/5$ .  
„ 10. Fossil scale of cone, external surface.  $22/1$ .  
„ 11. Recent scale of cone, external surface.  $22/1$ .

### Plate II.

#### *Pseudolarix Kaempferi* Gord.

- Fig. 1. Fossil dwarf-shoot.  $13/2$ .  
„ 3. Recent dwarf-shoot.  $5/1$ .  
„ 4. Detail of fossil dwarf-shoot.  $22/1$ .  
„ 5. Detail of recent dwarf-shoot.  $22/1$ .

#### *Gnetum scandens* Roxb.

- Fig. 2. Part of male inflorescence.  $5/1$ .  
„ 6. Detail of male inflorescence.  $22/1$ .
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PLATE I.

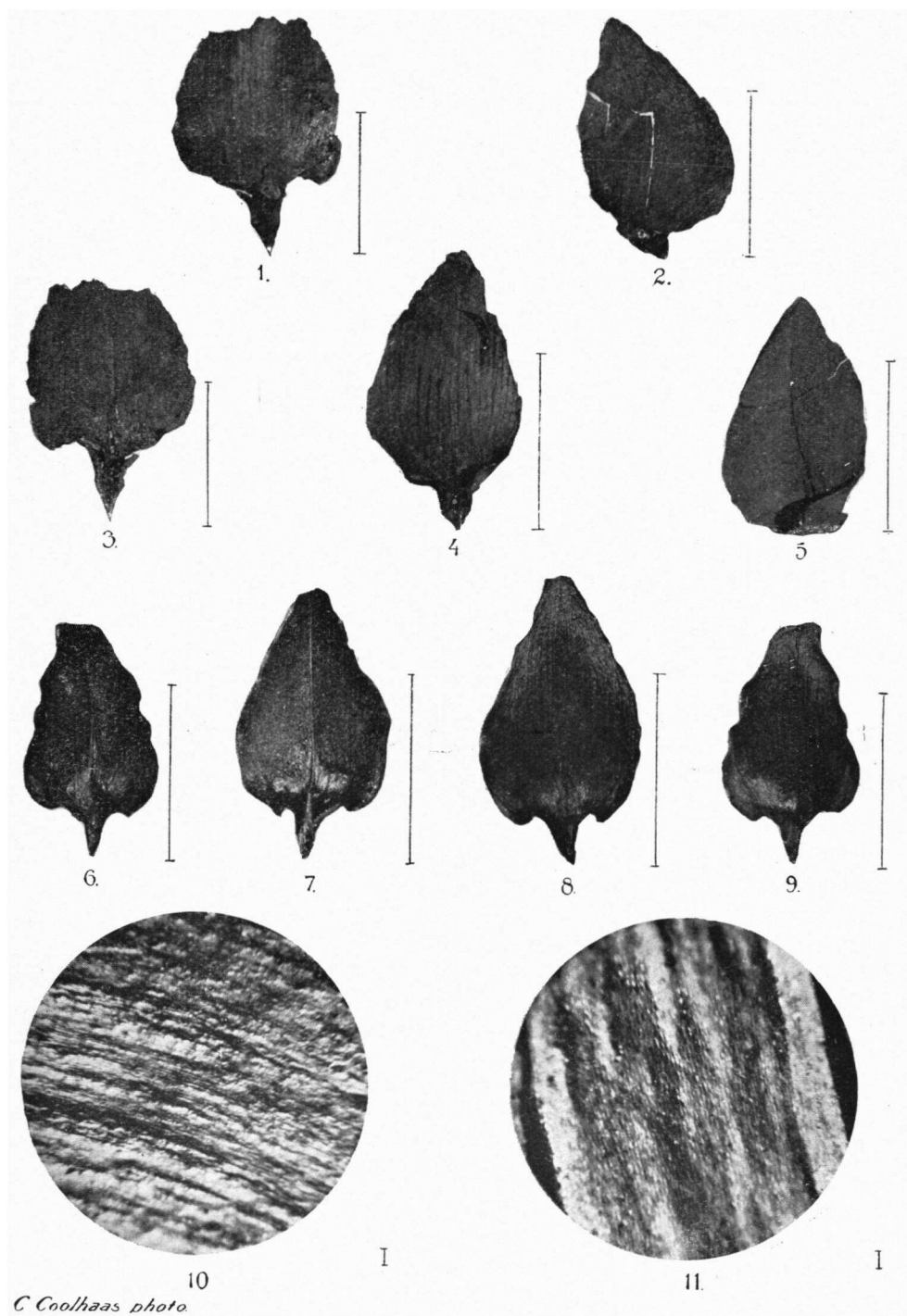
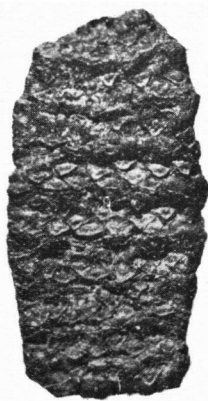


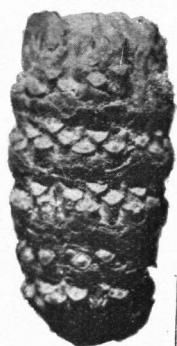
PLATE II.



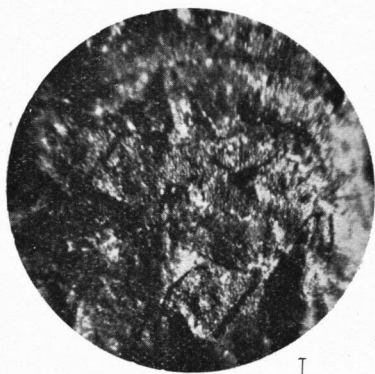
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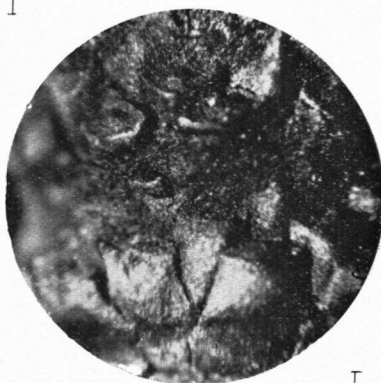
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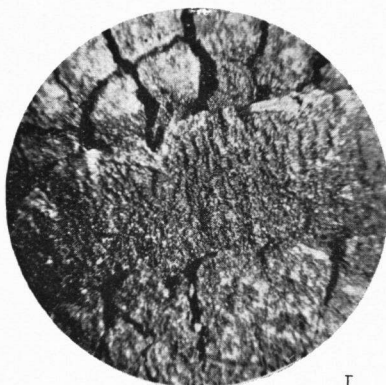
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5.



6.