A New Chinese Silver Fir.

BY

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With Plate CCXXXVI and One Figure in the Text.

Abies Georgei Orr, sp. nov.

Arbor 40-70-pedalis; ramuli annotini dense ferrugineo-villosi, vetustiores nigrescentes, longe fissi; cicatrices circulares; gemmae ovatae, obtusae, valde resinosae; perulae late ovatae, obtusae, persistentes per annos, ramulorum bases cingentes. Folia spiraliter inserta, pectinatim disposita, basi distincte constricta, margine leviter revoluta, apice plerumque emarginata, rare acuta vel obtusa, 15-25 mm. longa et 2 mm. lata, supra distincte canaliculata, subtus carinata et faciebus latis albis binis stomatiferis praedita; canales resiniferi marginales; hypodermis in facie ventrali contigua crassa, in facie dorsali tantum sub costa et in marginibus praesens. Amenta mascula apicem versus ramulorum aggregata, manifeste stipitata, 30 mm. longa. Strobili maturi violaceo-brunnei, ovati, sessiles, circa 9 cm. longi et 4-5 cm. lati, leviter resinosi; squamae late obovato-cuneatae, 2 cm. longae et 2 cm. latae, basi leviter auriculatae, stipitatae, apice rotundatae paulo incurvatae, extus brunneo-tomentosulae; bracteae oblongae et manifeste exsertae, apice triangulare erecto et margine erosa, cuspide 6 mm. longo erecto vel recurvo; semina circa 1 cm. longa et 5 mm. lata, alis squamam aequantibus nitidis brunneis, 5 mm. longis et 1 cm. latis.

"N.W. Yunnan. Chien-Chuan-Mekong divide. Lat. 26° 40′ N. Long. 90° 40′ E. Alt. 12-14,000 ft. Tree of 40-70 ft. In fruit. In conifer forests. Sept. 1922." G. Forrest No. 22,547 (Type).

"N.W. Yunnan. Chuiza Shan. Tree of 30-40 ft." G. Forrest No. 30,853.

The type specimen of *Abies Georgei* came from the divide lying to the south-west of the Lichiang range—the locus classicus of *Abies Forrestii*—and No. 30,853 from the Wei-Hsi area, about fifty miles further north, on the borders of the unexplored Moso country. Particulars of the locality, and the date of collection are wanting in the case of the latter, but the material was gathered by Forrest in the course of his last expedition, which ended so tragically at Tengyueh

in the spring of last year. A consignment of the seed of this new silver fir has now reached this country, and, already, seedling plants are to be seen in the propagating pits in the Royal Botanic Garden, Edinburgh.

Abies Georgei is closely related to *Abies Forrestii* Craib, the introduction of which into cultivation some years ago we owe also to the late Mr. George Forrest. It seems fitting, therefore, that such nearly allied species should both perpetuate the name of this indefatigable explorer and collector.

I am somewhat reluctant to add yet another species to the perplexing series of forms which represent the genus *Abies* in Western China, but on the evidence afforded by a critical analysis of native material of the group of Chinese silver firs which includes *A. Forrestii* Craib, *A. Faberi* Craib and *A. Faxoniana* Rehder & Wilson—to each of which this new species approximates in one way or another—I feel nevertheless that it would be a negation of one's systematic sense to ascribe the plant I have named *A. Georgei* to any one of these. In order to make clear the systematic position of this new species I shall contrast the material at my disposal with that of the species named above, and in doing so I shall confine my observations to native plants, for I am mindful of the confusion that exists regarding the status of certain recent introductions from China, much of which is due to the extraordinary dissimilarity of native specimens and cultivated plants of one and the same species. This apparent lack of resemblance is caused by the interaction of many factors, and time alone will tell whether the distinctive features of *A. Georgei*, so marked in herbarium material, will persist to the same degree in cultivation.

The most striking feature of this new species, and one which separates it at once from its nearest ally, *A. Forrestii*, is the much greater prominence of the distal portion of the bract-scales of the cone, and the unusual length of the cusp with which each is surmounted. These specific characters are illustrated in the accompanying plate ccxxxvi, which includes a drawing of an almost ripe cone of No. 30,853 (fig. 1), and one of a mature cone of No. 22,547 (fig. 2). For these, and the other drawings, I am indebted to my assistant, Miss B. G. Watts.

In the mature cone which is figured many of the cusps had become detached from the scales previously, but these structures are well shown in fig. 1, where their unusual size (they are upwards of 10 mm. in length) gives to the cone a distinctive appearance, the exserted, triangular part of the bract-scale being of a glaucous blue colour, with a brown, erose margin. In the cones of the type specimen the bract-scales are actually broader than they appear to be from the drawing, and, for the most part, they are of such a size that they almost conceal the subjacent cone-scales from view. In the cones of *A. Forrestii*, on the other hand, the bract-scales are but slightly exserted, and possess a much abbreviated cusp. The entire cone of *A. Georgei* is

not larger than that of *A. Forrestii*, but the conspicuous bract-scales in the mass with their distinctive colouring renders the former much more effective.

The mature cone of *A. Forrestii* had not been seen by Craib* when he drew up his description of that species, but since the date of publication in 1919 cultivated plants of *A. Forrestii*, grown from seed of Forrest's No. 6744, have coned freely in this country and the general features of the cone are now well known. Forrest's No. 22,350 collected in N.W. Yunnan in 1922 also bears a mature cone, which, though more robust, corresponds to those produced in cultivation. A coning branch of *A. Forrestii* is figured in the Botanical Magazine.†

In addition to the strong contrast in the external appearance of the cones in question the individual scales exhibit minor points of difference which will become apparent if fig. 3, pl. ccxxxvi is contrasted with fig. 1, *b*, below. The former depicts a single cone-scale of *A. Georgei* with bract-scale attached, seen from the under side, and the latter shows the corresponding parts from a cone of *A. Forrestii*.

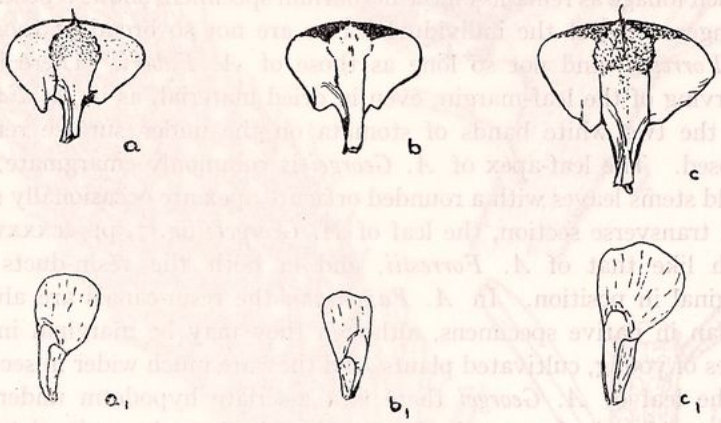


Fig. 1—Cone and bract-scales of *A. Faberi* Craib (*a*), *A. Forrestii* Craib (*b*), and *A. Faxoniana* Rehd. & Wils. (*c*), with one seed of each. Nat. size.

It will be seen at a glance that not only do the cone-scales of the two species differ in shape, but also that the bract-scale of *A. Georgei*, with its parallel margins and triangular apex, is quite unlike the spatulate bract-scale of *A. Forrestii*. Similar distinctions become evident when the scales of the new species are compared with those of *A. Faberi* (fig. 1, *a*) and *A. Faxoniana* (fig. 1, *c*). Another feature separating the latter from *A. Georgei* is to be found in the colour of the indumentum which clothes the ventral surface of the cone-scale in both species. In *A. Faxoniana* this indumentum is yellow; in *A. Georgei* it is reddish-brown. There is little to be said regarding the seeds of these species, for they differ in minor details only, save that in the case of *A. Faxoniana* there is again a colour

* W. G. Craib in Notes, Roy. Bot. Gard. Edin., lv (1919), 279.

† Curtis's Botanical Magazine, cliii, tab. 9201, fig. 8.

distinction. Here the actual seed is visibly tinged with purple, while brown is the prevailing colour in the other species of this group.

Turning to the vegetative organs we find in these a combination of characters, morphological and anatomical, by means of which *A. Georgei* may be readily recognised. The youngest branches, which are reddish-brown in colour, have a corrugated surface, narrow ridges extending lengthwise from the leaf-bases (fig. 6, pl. ccxxxvi). The shallow furrows between the ridges, as well as the latter, are thickly coated with a rusty-red pubescence, in which respect the young branches bear a close resemblance to those of *A. Faxoniana*, whereas in *A. Forrestii*, to quote Craib, "branchlets in the first year are brown, glabrous, or with scattered, erect, stiff hairs." Like those of *A. Forrestii* the older branches of *A. Georgei* are much darker in colour, and tend to become fissured in the furrows.

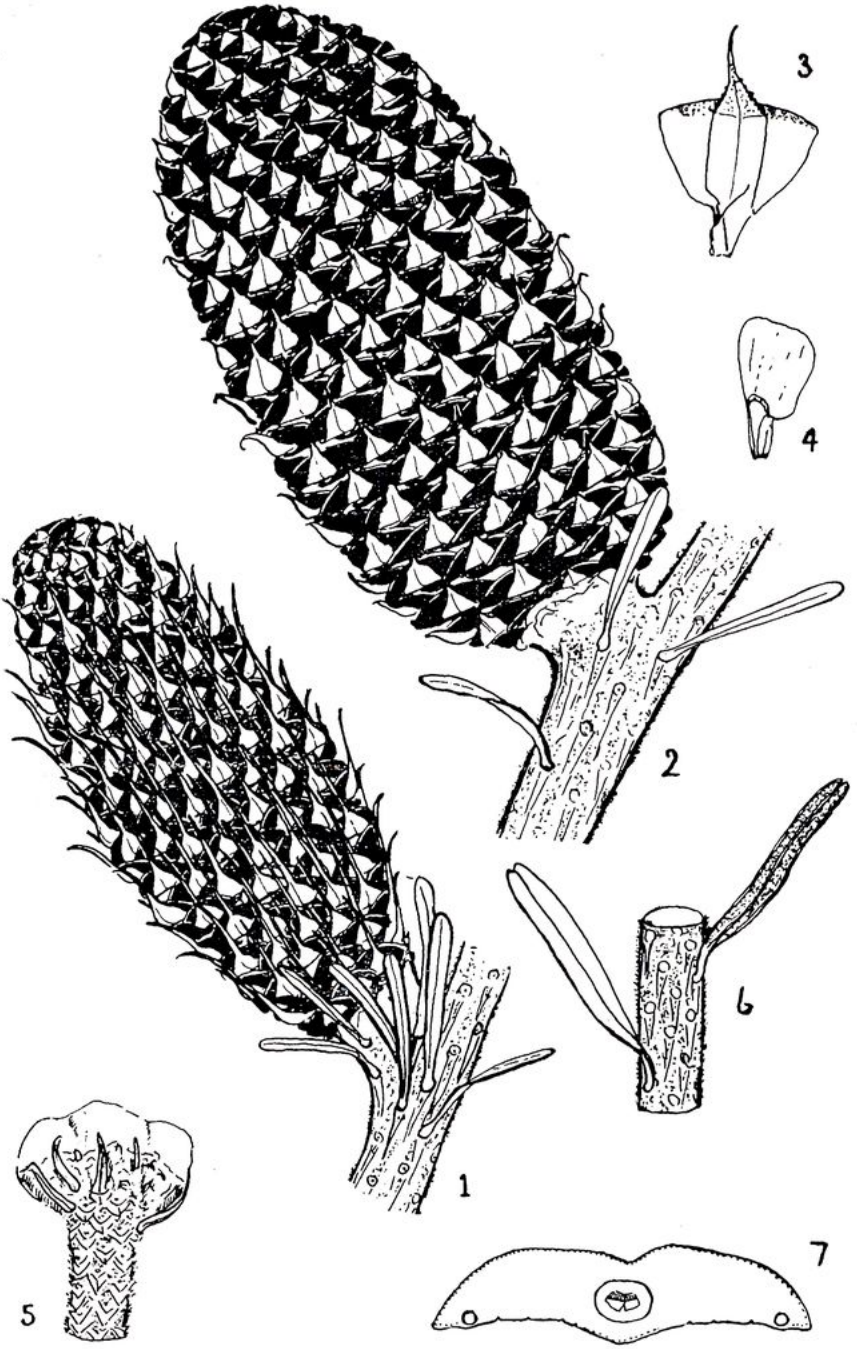
The broadly ovate buds (fig. 5, pl. ccxxxvi) are concealed within a mass of yellowish resin, and are much larger than the less-resinous, purplish buds of *A. Faxoniana*, but are somewhat similar in size and outward appearance to those of *A. Forrestii*.

Such foliage as remains on the herbarium specimens shows a pectinate arrangement, but the individual leaves are not so broad as those of *A. Forrestii*, and not so long as those of *A. Faberi*. There is no incurving of the leaf-margin, even in dried material, as in *A. Faberi*, and the two white bands of stomata on the under surface remain exposed. The leaf-apex of *A. Georgei* is commonly emarginate, but on old stems leaves with a rounded or acute apex are occasionally seen.

In transverse section, the leaf of *A. Georgei* (fig. 7, pl. ccxxxvi) is much like that of *A. Forrestii*, and in both the resin-ducts are marginal in position. In *A. Faxoniana* the resin-canals are always median in native specimens, although they may be marginal in the leaves of young, cultivated plants, and they are much wider in section. In the leaf of *A. Georgei* there is a 2-seriate hypoderm under the upper epidermis, but on the lower side this tissue is confined to the margins and the midrib. There is also a group of thick-walled elements below the divided vascular bundle.

In drawing comparisons between *A. Georgei* and its allies, I have refrained deliberately from including *A. Delavayi* Franchet among the latter, not because I consider it to be identical with *A. Faberi* Craib, for they are obviously dissimilar, but for the reason that native material of *A. Delavayi* is so distinctive in its character that there seems to be no possibility of confusing *A. Georgei* with it.

From the foregoing description of the reproductive and vegetative parts of *A. Georgei* it will be admitted, I think, that this Chinese silver fir is sufficiently outstanding from its congeners to merit specific status. In the *Faberi-Forrestii-Faxoniana* plexus it would appear, from a taxonomic standpoint, to occupy a position intermediate between the last two species, but approximating more nearly perhaps to *A. Forrestii*.



Abies Georgei Orr.

When referring to these Chinese firs in this paper I have retained throughout the specific designations by which they are generally known, although I am well aware of the new combinations recently proposed by A. B. Jackson* who, while advocating the retention of *A. Delavayi* Franchet, in which he merges *A. Faberi* Craib, would relegate the two other species named above to varietal rank. This is not the occasion for a detailed discussion of the merits, or demerits, of such a grouping, but a brief expression of my personal opinion on this subject will be found in "Conifers in Cultivation."† I would again lay stress, however, on the inadvisability of basing a conception of the Chinese species of *Abies* on the characters exhibited by their progeny in cultivation, and I would even go so far as to suggest that the non-conformity to type which has been such a puzzling feature of certain cultivated Chinese Conifers may not be due entirely to the youth of the plants, or to the effect of a changed environment, but may be the outcome of a segregation of characters of hybrid origin.

* A. B. Jackson in "Conifers in Cultivation" (The Report of the Conifer Conference, Nov. 1931), p. 243. London. 1932.

† M. Y. Orr, idem, p. 252.

Explanation of Plate CCXXXVI.

Illustrating Mr. M. Y. Orr's paper on A New Chinese Silver Fir.

Fig. 1.—Cone of *Abies Georgei*, G. Forrest, No. 30,853. Fig. 2.—Mature cone of *Abies Georgei*, G. Forrest, No. 22,547. Fig. 3.—Cone-scale of No. 22,547. Fig. 4.—Seed of the same. Fig. 5.—Terminal bud. Fig. 6.—Segment of a young branch. Fig. 7.—Leaf in section showing marginal resin-canals.

Figs. 1-4 are natural size, figs. 5-6 are enlarged to 1½ times, and fig. 7 to about 20 times natural size.