

*Rhus javanicum* Thunberg, Fl. Jap. 121 (1784) et auctt.—Non Linnaeus.  
*Rhus semialata* Murr. var. *Osbeckii* De Candolle, Prodr. II. 67 (1825).  
*Rhus Osbeckii* Decaisne ex Steudel, Nomencl. Bot. ed. 2, II. 452 (1841), synonym.

Widely distributed in China, extending as far north as Korea, very abundant in south-eastern China, introduced in Java, native in Sumatra (*Yates no. 2125*, with wingless petioles), a form or variety in Indo-China, India and Formosa.

This is the unnamed *Rhus* in the Linnean Herbarium pinned to the type sheet of *Rhus javanica* Linn. It is apparently the form considered by Rehder and Wilson as *Rhus javanica* Linn. var. *Roxburghii* (DC.) Rehd. et Wils. in Sargent Pl. Wilson. II. 179 (1914) (*Rhus amela* D. Don) as the leaf rachises are wingless; *Rhus Osbeckii* Decne. (*R. semialata* Murr. ♂ *Osbeckii* DC.) would seem to be identical with *R. javanica* Linn. var. *Roxburghii* Rehd. et Wils. On account of the numerous intergrading forms there is grave doubt as to whether or not a variety should be recognized here, and I prefer to refer these names to *Rhus semialata* Murr. as synonyms.

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## ENUMERATION OF THE LIGNEOUS PLANTS COLLECTED BY J. F. ROCK ON THE ARNOLD ARBORETUM EXPEDITION TO NORTHWESTERN CHINA AND NORTHEASTERN TIBET

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IN charge of the Arnold Arboretum expedition to northwestern China and northeastern Tibet Mr. J. F. Rock sailed from San Francisco on September 30, 1924. Originally planned to occupy two years, the expedition, owing to the disturbed political condition in China, occupied until September, 1927. Travelling by the usual route across the Pacific Ocean Mr. Rock disembarked at Shanghai. Later he proceeded to Hongkong and to Haiphong in Tonkin, where he arrived on November 5th. From Haiphong he went by railway to Yunnan-fu, where his caravan was collected and by arrangement the collectors he had employed on a former expedition met him. From there the expedition proceeded overland to Suifu on the Yangtze River arriving on January 27th after a dangerous and arduous trip. From Suifu Mr. Rock went on to Chentu-fu, the provincial capital of the Szechuan province, and later proceeded northward by the main highway to the Kansu border, reaching the town of Choni early in May, 1925. After the necessary arrangements were completed the exploration of the almost unknown Tebbu country to the south—south-west of Choni—was commenced and continued until late August.

In October Mr. Rock explored the Kokonor region in northeastern Tibet and from there journeying in an easterly direction spent some time examining the Richthofen chain, which was found very bare of vegetation.



Mr. Rock wintered in Choni and in the spring of 1926 set out for the unknown region of Amnyi Machen toward the headwaters of the Yellow River, a journey fraught with grave dangers and hardships. He found the Amnyi Machen range high and barren, but in the valley of the Yellow River heavily wooded ravines. The autumn of 1926 was spent in the further investigation of the Tebbu country, the flora of which proved to be very rich.

Owing to the continued disturbed state of the country it was necessary for Mr. Rock to again winter in Choni. On March 10, 1927 he left that town travelling in a southwesterly direction to Sungpang-ting. From there he descended the Min River to Kuan hsien, crossed the plain to Chentu, then by the overland route to Chungking, hence by steamer down the Yangtze River to Shanghai, where he arrived on May 7th.

On this expedition Mr. Rock collected 2,939 numbers of herbarium specimens estimated in all at about 20,000 sheets. Of these approximately 1,606 numbers are ligneous plants and these will be enumerated in this Journal. References to species collected by Rock elsewhere than in Kansu and Tibet will appear in smaller type. The herbaceous plants will be named by specialists and it is hoped to publish a numerical list of them at the end of this enumeration.

#### GINKGOACEAE

Determined by E. H. WILSON

*Ginkgo biloba* Linnaeus, Mant. Alt. 313 (1771).—Shirasawa, Icon. Ess. For. Jap. i. 10, t. 8, fig. 1-14 (1900).—Rehder & Wilson in Sargent, Pl. Wilson. II. 1 (1914), where full account of the literature and synonymy is given.—Rehder in Jour. Arnold Arb. iv. 117 (1923).

SOUTHWESTERN KANSU. Tao River basin: in valley, 10 li beyond Pi kou, no. 12088, April 1925.

#### TAXACEAE

Determined by E. H. WILSON

*Cephalotaxus Fortunei* Hooker in Bot. Mag. LXXVI. t. 4499 (1850).—Rehder & Wilson in Sargent, Pl. Wilson. II. 4 (1914), where full account of the literature and synonymy is given.—Wilson in Jour. Arnold Arb. VII. 29 (1926).

SOUTHWESTERN KANSU. Tao River basin: gorge of Minchow ho, south of Minchow, alt. 1830-2135 m., no. 12086, April 1925 (shrub 1.5-3 m. high).

WESTERN SZECHUAN. Mountains of Ching chuan, no. 12053, April 1925 (shrub 1.5-1.8 m. high).

NORTHEASTERN YUNNAN. Near Laitoupu, alt. 2740 m., no. 12002, Dec. 1924 (shrub 3 m. high).

The scaling red-brown bark serves as a ready means of distinguishing



this plant from the related *C. drupacea* S. & Z. This species has not before been reported from Kansu.

The Chinese Yew (*Taxus chinensis* Rehd.) was collected in Kansu by F. N. Meyer but was not seen by Mr. Rock.

## PINACEAE

Determined by E. H. WILSON

With the great number of specimens collected by J. F. Rock and those of several other collectors represented in this herbarium it is possible to get some idea of the coniferous wealth of Kansu and adjacent Tibet. Mr. Rock in his notes and letters tells of the rich forests of Spruce and Silver Fir which he met with, notably in the Tebbu country and on the Minshan. Further west in the gorges of the upper Yellow River he tells of large areas covered with Juniper forests. Evidently, there is much coniferous forest wealth in these remote regions. In the paucity of species the flora, however, shows not only its boreal character but the influence of the dry, arid regions of the Gobi desert to the north and northwest and the austere region of Tibet to the west. In the south and southwestern parts of the province the climate is more moist and the flora, correspondingly, richer in variety. The flora in general appears to be on one hand an extension of that of northern and northwestern Szechuan and of Shensi on the other, a condition which from its geographical position one would naturally suspect.

Of Conifers, apart from Junipers, no species appears to be peculiar to Kansu. The two species of *Pinus* collected by Rock are widely distributed in China. One other species, *Pinus Bungeana* Zucc., which has been reported from Kansu, was not collected by Rock. The Larch (*Larix Potaninii* Batal.) is widely distributed in the alpine regions of northern and western China. Of the three species of Spruce, *Picea Wilsonii* Mast. has been reported from many parts of northern China ranging from the eastern province of Chili westward to Kansu. The other two species are abundantly represented in northwestern Szechuan. Of the four species of *Abies* three form forests in northwestern Szechuan; the fourth species, *A. chensiensis* Van Tiegh., has so far been reported only from Shensi and western Hupeh. Of these Silver Firs *A. chensiensis* Van Tiegh. and *A. recurvata* Mast. have not before been found in Kansu.

The *Cupressus* is found also in the river valleys of Szechuan and Yunnan. The Arborvitae (*Thuja orientalis* L.), also known from Kansu, was not collected by Rock. *Juniperus* with nine species and several varieties is by far the best represented genus of Conifers in Kansu. Of these species five are critical and further knowledge may reduce their number. Fortunately, Rock collected seeds of all, so in the course of time it will be possible to observe the behavior of these plants under cultivation and get a better idea of their relationship. Of the newer monospermous species three had been collected by the Russian travellers, Przewalski, Roborowski and Potanin, and have been recently described by Komarov. Two, *J. distans*



Florin and *J. glaucescens* Florin, were first collected by H. Smith in 1921-22 in northwestern Szechuan and described by Florin in 1927. One dwarf variety of *J. chinensis*, found on the sand dunes of the Kokonor, is apparently new.

***Pinus Armandi*** Franchet in Nouv. Arch. Mus. Paris, sér. 2, vii. 95, t. 12 (Pl. David. i. 284) (1885).—Shaw in Sargent, Pl. Wilson. ii. 12 (1914).—Wilson, Conif. Tax. Jap. 20 (1916).—Rehder in Jour. Arnold Arb. iv. 119 (1923).—Wilson in Jour. Arnold Arb. vii. 45 (1926), where full account of the literature is given.

*Pinus koraiensis* Beissner in Nuov. Giorn. Bot. Ital. n. ser., iv. 184 (1897).—Non Siebold & Zuccarini.

*Pinus scipioniformis* Masters in Bull. Herb. Boissier, vi. 270 (1898).

*Pinus mandschurica* Masters in Jour. Linn. Soc. xxvi. 551 (1902).—Non Ruprecht.

*Pinus Mastersiana* Hayata in Gard. Chron. ser. 3, xliii. 194 (1908).

*Pinus Armandi* var. *Mastersiana* Hayata in Jour. Coll. Sci. Tokyo, xxv. art. xix. 215, f. 8 (Fl. Mont. Formos.) (1908).

*Pinus levis* Lemée & Léveillé in Fedde, Rep. Spec. Nov. viii. 60 (1910).

*Pinus excelsa* var. *chinensis* Patschke in Bot. Jahrb. xlviii. 657 (1912).

**SOUTHWESTERN KANSU.** Lower Tebbu country: Wantsang ku, limestone cliffs, alt. 2740-2890 m., no. 15019, Sept.-Oct. 1926.

**CENTRAL KANSU.** Lien ho a shan: among rocks, alt. 3050 m., nos. 12707, 13463, July 14-20 and Oct. 1925 (tree 12-18 m. tall).

This Pine so abundant in central and southwestern China and on the mountains of Formosa is apparently not common in Kansu.

***Pinus tabulaeformis*** Carrière, Traité Conif. ed. 2 510 (1867).—Rehder in Jour. Arnold Arb. vii. 22 (1926).—Wilson in Jour. Arnold Arb. vii. 42 (1926).

*Pinus leucosperma* Maximowicz in Bull. Acad. Sci. St. Pétersb. xvi. 558 (1881).

*Pinus Thunbergii* Franchet in Nouv. Arch. Mus. Paris, sér. 2, vii. 95 (Pl. David. i. 285 (1884); in Jour. de Bot. xiii. 253 (1899).—Beissner in Nuov. Giorn. Bot. Ital. n. ser. iv. 185 (1897).—Masters in Jour. Linn. Soc. xxvi. 552 (1902); xxxvii. 417 (1906).—Patschke in Bot. Jahrb. xlviii. 658 (1912).—Non Parlatore.

*Pinus densiflora* Franchet in Jour. de Bot. xiii. 253 (1899).—Masters in Jour. Linn. Soc. xxvi. 549 (1902); xxxvii. 416 (1906).—Shaw in Sargent, Pl. Wilson. i. 2 (1911).—Patschke in Bot. Jahrb. xlviii. 658 (1912).—Non Siebold & Zuccarini.

*Pinus funebris* Komarov in Act. Hort. Petrop. xx. 177 (1901).

*Pinus densiflora* var. *tabuliformis* Masters in Jour. Linn. Soc. xxvi. 549 (1902).

*Pinus Henryi* Masters in Jour. Linn. Soc. xxvi. 550 (1902); xxxvii. 416 (1906).—Patschke in Bot. Jahrb. xlviii. 658 (1912).

*Pinus sinensis* Mayr, Fremdl. Wald. & Parkb. 349, fig. 113 (1906), in part.—Shaw in Sargent, Pl. Wilson. ii. 15 (1914); Gen. Pinus, 60, t. 23, fig. 201-207 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923); in Jour. Arnold Arb. iv. 120 (1923).—Dallimore & Jackson, Handb. Conif. 451, fig. 99 (1923).

*Pinus Argyi* Lemée & Léveillé in Fedde Rep. Spec. Nov. viii. 60 (1910).

*Pinus Cavaleriei* Lemée & Léveillé, l. c.

*Pinus Wilsonii* Shaw in Sargent, Pl. Wilson. i. 3 (1911).

*Pinus Cavendishiana* Hort. ex Dallimore & Jackson, Handb. Conif. 451 (1923), synonym.



**SOUTHWESTERN KANSU.** Upper Tebbu country: Kadjaku valley, at Tatsuto, alt. 2620–2800 m., nos. 12538, 12996, 13449, June, July and Nov. 1925 (tree 12–18 m. tall).

**CENTRAL KANSU.** Lien ho a shan: Haku, along streams, alt. 2740 m., nos. 12776, 13461, July and Oct. 1925 (tree 21–24 m. tall).

*Larix Potaninii* Batalin in Act. Hort. Petrop. XIII. 385 (1893).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906); in Gard. Chron. ser. 3, XXXIX. 178, fig. 68 (1906).—Rehder & Wilson in Sargent, Pl. Wilson. II. 18 (1926).—Rehder in Jour. Arnold Arb. IV. 121 (1923).—Wilson in Jour. Arnold Arb. VII. 46 (1926).—Florin in Meddel. Göteborgs Bot. Trädgård, III. 2 (Pl. Sin. XVII. 2) (1927).

*Larix spec.* Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 97 (Pl. David. I. 287) (1884).

*Larix chinensis* Beissner in Mitt. Deutsch. Dendr. Ges. V. 68 (1896).

*Larix thibetica* Franchet in Jour. Bot. XIII. 262 (1899).

*Larix Griffithii* Masters in Jour. Linn. Soc. XXVI. 558 (1902).—Non Hooker f. & Thomson.

*Pinus sinensis* Voss in Putlitz & Meyer, Landlexicon. IV. 769 (1913).—Non Lambert.

**SOUTHWESTERN KANSU.** Tao River basin: Shimen of Hsiaoku, East Tebbu land, alt. 3050–3400 m., nos. 12803, 13723, 13465, July and Oct. 1925 (tree 12–18 m. tall). Upper Tebbu country: Tsarekika, north-west of Adjüan, no. 13465, Oct. 1925.

The collector remarks that this tree is common on conglomerate cliffs in the Tao River basin.

*Picea asperata* Masters in Jour. Linn. Soc. XXXVII. 419 (1906).—Rehder & Wilson in Sargent, Pl. Wilson. II. 22 (1914).—Wilson in Garden, LXXXVIII. 166 figs. (1924).—Florin in Meddel. Göteborgs Bot. Trädgård, III. 2 (Pl. Sin. XVII. 2) (1927).

*Picea Meyeri* Rehder & Wilson in Sargent, Pl. Wilson. II. 28 (1914), in part, as to the Kansu specimens.—Rehder in Jour. Arnold Arb. IV. 122 (1923), in part, as to the Kansu specimens.

*Picea Schrenkiana* Rehder & Wilson in Sargent, Pl. Wilson, II. 29 (1914), in part, as to Purdom's nos. 813, 790.—Non Fischer & Meyer.

**SOUTHWESTERN KANSU.** Tao River basin: mountains south-west of Choni, Valley of Laliku, alt. 2890 m., nos. 12934, 12938, July 1925 (tree 21–24 m. tall); along Taoho, east of Choni, alt. 2530 m., no. 12341, June 1925 (tree 24 m. tall); mountains south of Choni, alt. 2890 m., no. 12932, July 1925 (tree 18–24 m. tall); Choni, alt. 2740–3350 m., nos. 12120, 12157, 12590, May and July 1925 (tree 18–30 m. tall); mountains west of Choni, alt. 2890 m., no. 12931, July 1925 (tree 24 m. tall, bark greyish brown, scaly); Maerhku, Choni district, alt. 2740 m., nos. 13428, 13431, Oct.–Nov. 1925 (tree 18–24 m. tall); east of Adjüan, in Hsiaoku gorge, alt. 2890 m. no. 12659, July 5, 1925 (tree 15–24 m. tall, ascending branches); Kadjaku, northern slopes of Minshan, alt. 2890 m., no. 13433, Oct. 1925 (tree 24 m. tall). **Lower Tebbu country:** Wantsang Ssu, alt. 2440 m., nos. 14815, 15045, Sept.–Oct. 1926 (tree 15–



24 m. tall); Valley of Peshwekiang, alt. 2195 m., no. 14567, Aug. 29, 1926 (tree 15-18 m. tall); Mayaku valley, alt. 2740 m., nos. 14755, 15065, Sept.-Oct. 1926 (tree 18 m. tall). Upper Tebbu country: Kadjaku valley, slopes of Minshan, alt. 2890 m., nos. 12993, 12549, 12548, June 1925 (tree 18-30 m. tall); Tougwa camp, southern slopes of Minshan, alt. 2920 m., nos. 12545, 12969, June and Aug. 1925 (tree 18-30 m. tall); Drjakana district, alt. 2920 m., no. 13438, Nov. 1925 (tree 18-21 m. tall); Drjakana, Pandrukika, alt. 3350 m., no. 13446, Nov. 1925 (tree 15-21 m. tall); Between Kwang ke and Drjakana, alt. 3050 m., no. 15080, Sept.-Oct. 1926 (tree 9-12 m. tall); Opposite Lassungomba, alt. 3050 m., no. 12968, Aug. 1925 (tree 18-24 m. tall, bark flaky and grey); Valley of Chulungapu, below Pashetenga, alt. 2440 m., no. 15092, Oct. 1926 (tree 15-18 m. tall); Valley leading to Tsarekika, east Tebbu land, alt. 3050 m., no. 13459, Oct. 1925 (tree 24 m. tall).

CENTRAL KANSU. Lien ho a shan: alt. 3050-3350 m., nos. 12708, 13464, July-Oct. 1925 (tree 18-24 m. tall, bark flaky and grey, branches ascending).

NORTHWESTERN KANSU. Richthofen range and adjacent region: slopes of Mt. Ngui sin shan, between N. Kokonor barrier and R. range, alt. 3050-3400 m., no. 13309, Oct. 1925 (tree 30-36 m. tall, forming pure stands); northern slopes of N. Kokonor barrier range, in deep gorge, alt. 3050 m., no. 13307, Oct. 1925 (tree 27-30 m. tall, with short descending branches); dry rocky slopes on Hung shin gorge, northern slopes of Nanshan, Richthofen range facing Mongolia, alt. 2740 m., no. 13310, Oct. 1925 (tree 6-9 m. tall); Rako gorge, alt. 3050 m., no. 13662, Sept. 28, 1925 (tree 12-18 m. tall, trunk straight); slopes of the mountains in Babo district, back of the village and beyond Huangantassu, Baboho valley, alt. 3350 m., no. 13663, Oct. 1925 (tree 12-18 m. tall); mossy slopes of mountains opposite Komang Ssu monastery, northeast of Tankar, alt. 2890-3350 m., no. 13304, Oct. 1925 (tree 24-36 m. tall, trunk 0.6-1 m. in diameter, bark grey and scaly); mountains of Kanlungssu, alt. 2890-3050 m., no. 13313, Nov. 1925 (tree 15-21 m. tall).

WESTERN KANSU. Forests of Labrang, valley opposite Labrang monastery, alt. 2920-3200 m., no. 13699, Dec. 1925 (tree 15-18 m. tall).

EASTERN TIBET. Kokonor Region: Kako gorge, alt. 3350 m., no. 13281, Sept. 1925 (tree 15-24 m. tall, erect or branching from base); Bamba, southeast of Kokonor, alt. 2890 m., no. 13282, Sept.-Oct. 1925; between Tango and Kokonor in Lalaku, alt. 2890 m., no. 13341, Sept. 22, 1925 (tree 18-24 m. tall). Radja and Yellow River gorges: below Dzang monastery, near mouth of Gochen valley, above Radja gomba, alt. 3140, nos. 13901, 13903, May 13, 1926 (tree 15-24 m. tall); opposite Radja, slopes of Yellow River, alt. 3200-3350 m., nos. 13960, 13961, 13963, May 24, 1926 (12-45 m. tall); Dachso canyon, forming pure stands, alt. 3050-3350 m., no. 14063, June 1926 (tree 30-45 m. tall). Jupa Range: Jupa valley, alt. 3200-3650 m., nos., 14316, 14323,



14324, 14325, 14326, June 26–27, 1926 (tree 10–45 m. tall, bark grey, scaly, branches long, descending). Amnyi Machen range (west of Yellow River): Hjachen valley, near Yellow River, no. 14444, July 16, 1926 (tree 18–24 m. tall, trunk 0.3–0.6 m. in diameter, bark scaly, greyish brown, branches horizontal, forms forests).

From the abundance of material collected by Rock this species appears to be the commonest Spruce in Kansu, being particularly abundant on the mountains of the west and southwest. With its southern limits in northwestern Szechuan, this species is found over a vast tract of country. It would appear to be the only species found in northwestern Kansu and extends westward into eastern Tibet, where it forms forests at the mouth of the Hjachen valley near the upper waters of the Yellow River and under the shadow of the Amnyi Machen range of mountains.

This species is a tree of from 10–45 m. tall with a trunk sometimes 3 m. in girth with the general aspect of the Norway Spruce (*Picea Abies* Karsten). The leaves are thick, more or less curved, pungent and vary from dark green to glaucous. The branchlets are stout, often pruinose, yellow-orange to pale brown, sometimes crowded with peg-like, spreading or ascending-spreading, sometimes recurved petioles tumid at the base, yellowish grey and more or less pubescent. The degree of pubescence varies greatly and often on the same tree from year to year. In nos. 12993 and 13309 the shoots are densely clothed with a short, curled villose pubescence; in nos. 13960 and 15080 the pubescence is almost wanting; in no. 12932 the branchlets are glabrous. The winter-buds are very characteristic, conical, always much swollen at the base, with thin, loosely imbricated, shining bud-scales, free and often inclined to be recurved at the summit. The cone varies in size from 6–12 cm. in length. Its comparatively wide range of variation, notwithstanding, *Picea asperata* Mast, is a well-marked and easily recognizable species.

Without questioning the specific validity of *P. Meyeri* Rehder & Wilson the suite of specimens collected by Rock convinces me that the material from Kansu referred to this species by my colleague, Alfred Rehder, and self when first describing Meyer's Spruce belongs to *P. asperata* Mast. Discovered in the neighborhood of Sungpang-ting by E. H. Wilson in August, 1903, and by him introduced into cultivation in 1910, *P. asperata* Mast. is perfectly hardy in the Arnold Arboretum. It grows fairly rapidly, is of handsome appearance, and promises to be a useful addition to the list of Spruces hardy in Massachusetts.

*Picea Wilsonii* Masters in Gard. Chron. ser. 3, xxxiii. 133, fig. 55, 56 (1903).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 27 (1914).—Rehder in Jour. Arnold Arb. iv. 122 (1923).—Wilson in Garden lxxxviii. 166, figs. (1924).—Florin in Meddel. Göteborgs Bot. Trädgård, iii. 2 (Pl. Sin. xvii. 2) (1927).

*Picea obovata* var. *Schrenkiana* Pritzel in Bot. Jahrb. xxix. 217 (1900).—Masters in Jour. Linn. Soc. xxvi. 554 (1902).—Non Carrière.



*Picea Maximowiczii* Masters in Jour. Linn. Soc. xxvi. 554 (1902), as to the Chinese specimen.—Non Regel.

*Picea Watsoniana* Masters in Jour. Linn. Soc. xxxvii. 419 (1906).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 27 (1914).

*Picea Mastersii* Mayr, Fremdl. Wald. & Parkb. 328, figs. 105, 106, 107 (1906).

*Abies spec.* Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. xv. 23, no. 22671 (1909).

*Picea Schrenkiana* Rehder & Wilson in Sargent, Pl. Wilson. ii. 29 (1914), in part.—Non Fischer & Meyer.

SOUTHERN KANSU. mountains of Motzuping, alt. 1525 m., no. 12062, April 1925 (tree 12 m. tall, pyramidal).

SOUTHWESTERN KANSU. Tao River basin: south of Minchow, mountains beyond Tan chang, alt. 2440 m., no. 12087, April 1925 (tree 24 m. tall); Choni, slopes of Taoho valley, alt. 3050 m., no. 12132, May 1925 (tree 15–21 m. tall); forests of Choni, alt. 2740–3200 m., no. 12119, May 1925 (tree 18–24 m. tall, branches drooping); Choni, Maerhku valley, alt. 2890 m., nos. 12930, 13426, July and Nov. 1925 (tree 9–21 m. tall, branches drooping); mountains southwest of Choni, valley of Laliku, alt. 2890 m., nos. 12933, 12663, 14935, July and Oct. 1925 (tree 9–24 m. tall). Lower Tebbu country: Wantsang valley, alt. 2440–2590 m., nos. 14678, 14694, 14740, Sept. 1926 (tree 24–39 m. tall, bark pale brown in small square flakes); mountains back of Wantsang gomba, alt. 2740 m., no. 14808, Sept. 1926 (tree 18–24 m. tall); forests of Wantsang ku, alt. 2890 m., no. 15021, Sept.–Oct. 1926 (tree 30–45 m. tall); mountains of Wantsang valley of Chulungapu, alt. 2890 m., no. 15048, Sept.–Oct. 1926 (tree 15–24 m. tall); upper Mayaku valley, alt. 2740–2890 m., nos. 14754, 14756, 14776, 14775, 15068, Sept.–Oct. 1926 (tree 15–24 m. tall); Mayaku, *Picea* forest, alt. 2740 m., no. 15064, Sept.–Oct. 1926 (tree 18 m. tall); Ngongo, gorges of Chulungapu, alt. 2890 m., nos. 14964, 14975, Sept.–Oct. 1926 (tree 30–45 m. tall). Upper Tebbu Country: Tougwa camp, southern slopes of Minshan, alt. 2990 m., nos. 12543, 12544, 12546, June 1925 (tree 12–24 m. tall); Djrakana district, alt. 3050–3200 m., nos. 12971, 12980, 12982, 12995, 13443, 13452, 13453, August and Nov. 1925 (tree 9–54 m. tall, bark greyish brown, fissured into irregular elongated scales, branches ascending or spreading); Yiwaku, beyond Drjakana, alt. 2600–2800 m., nos. 14574, 14575, 15086, Aug. 28 and Oct. 1926 (tree 9–24 m. tall); Gadza, alt. 2490 m., no. 14571, Aug. 28, 1926 (tree 30–45 m. tall, branches short, drooping in old trees); forests around Gadza and Boho gomba, alt. 2740 m., nos. 15089, 15091, Oct. 1926 (tree 12–45 m. tall); Lissedzadza, East Tebbu land, alt. 3350 m., no. 13457, Oct. 1925 (tree 4–6 m. tall).

This the most widely distributed of the Chinese species of Spruce is apparently abundant in southwestern Kansu and there reaches its western limits. Eastward its range extends across north China to the Weichang region in northern Chili. The southern limits appear to be northern Hupeh and the most southwestern point from which it has been reported is the neighborhood of Sungpang-ting. It is easily distinguished by its



ashy gray branchlets and very numerous ovoid, chestnut-brown winter-buds, its pectinately arranged, slender, pungent leaves, green on both surfaces. According to Rock it is a tree sometimes up to 45 m. tall with a trunk 1 m. in diameter. The branchlets vary considerably in degree of thickness, though they are usually slender or relatively so. Almost invariably they are quite glabrous but occasionally, as in nos. 12930 and 15021, a minute pubescence is present. The petioles are short, ascending and purplish. The cone varies in length from 4 to 7 cm.

With the great number of specimens collected by Rock it becomes evident that *P. Watsoniana* Mast. can no longer be regarded as a species distinct from *P. Wilsonii* Mast. or even as a variety. It represents merely an extreme condition of *P. Wilsonii* Mast. characterized by its very slender branches, and leaves and by its small cones. The other extreme is represented by Rock's number 12132, which has very stout branchlets, short, thick leaves and represents the plant named *P. Mastersii* by Mayr.

This Spruce was discovered and introduced into cultivation in 1901 by E. H. Wilson who found it in northern Hupeh. In 1903 he discovered and introduced from Sungpang-ting the form which Masters named *P. Watsoniana* and this has been growing in the Arnold Arboretum since 1907. Subsequently in 1908 W. Purdom collected seeds of *P. Wilsonii* Mast. in quantity both in the Weichang, in Shensi and in Kansu and many plants raised from these seeds are now growing freely in this country. Like the other Spruces of northwestern China it has proved perfectly hardy in the Arnold Arboretum, where it grows fairly rapidly but its leading shoots suffer from attacks of boring insects.

*Picea purpurea* Masters in Jour. Linn. Soc. xxxvii. 418 (1906).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 29 (1914).—Rehder in Jour. Arnold Arb. iv. 123 (1923).—Florin in Meddel. Göteborgs Bot. Trädgård, iii. 2 (Pl. Sin. xvii. 2) (1927).

SOUTHWESTERN KANSU. Tao River basin: mountains southwest of Choni, Valley of Laliku, alt. 2890 m., nos. 12937, 12935, 12936, July 1925, (tree 12–15 m. tall, branches drooping); Choni district, Maerhku valley, alt. 2890–2950 m., nos. 13424, 13427, 13430, Oct. 1925, (tree 12–15 m. tall); mountains of Choni, west of Taoho, alt. 3050 m., no. 12146, May 1925 (tree 18–24 m. tall); east of Adjüan, Hsiaoku gorge, alt. 2890 m., nos. 12660, 12662, July 1925, (tree 15–24 m. tall, branches short, drooping); Tao River watershed, alt. 2890 m., nos. 12256, 12257, June 1925, (tree 12–24 m. tall); Kadjaku, northern slopes of Minshan, alt. 2890 m., no. 13434, Oct. 1925, (tree 7.5–9 m. tall). Lower Tebbu country: Wantsang valley, alt. 2920–3050 m., no. 14835, Sept. 1926, (tree 24–36 m. tall). Upper Tebbu country: Valley of Kadjaku, west of Choni, no. 12992, July 1925 (tree 18–21 m. tall, cone-shaped and symmetrical); Kadjaku, northern slopes of Minshan, alt. 3050 m., no. 13472, Oct. 1925, (tree 18 m. tall); Laluku, en route to Shimen, alt. 3050 m., no. 13439, Nov. 1925, (tree 12–15 m. tall); Adjüan-Tayüku, beyond Shimen, East



Minshan, alt. 3050 m., no. 13458, Nov. 1925, (tree 18–24 m. tall); Tougwa camp, southern slopes of Minshan, alt. 2920 m., nos. 12540, 12550, June 1925, (tree 15–30 m. tall); Tayüku, Lissedzadza, eastern end of Tebbu country, alt. 3050 m., no. 13455, Nov. 1925, (tree 12–15 m. tall); Tsaluku valley, Minshan, alt. 3200 m., no. 12985, Aug. 1925, (tree 15 m. tall); West Adjüan, East Tebbu land, alt. 3200 m., no. 13460, Oct. 1925, (tree 18–21 m. tall); Upper Chabaku valley and Tsang ayeku valley, west of Kwang Kei, no. 12991, Aug. 1925, (tree 24 m. tall, branches short, horizontal, branchlets drooping); Drjakana district, alt. 3050–3200 m., nos. 12974, 13441, 13442, Aug. and Oct.–Nov. 1925, (tree 12–15 m. tall); enroute to Pandrukika; alt. 3350–3500 m., nos. 12966, 12967, 12975, 12986, Aug. 1925, (tree 15–18 m. tall).

CENTRAL KANSU. Lien ho a shan: alt. 2740–3050 m., nos. 12706, 12709, 13462, July and Oct. 1925, (tree 15–21 m. tall); between Taochow and Titao, alt. 3200 m., no. 12671, July 1925, (tree 12 m. tall, branches ascending, bark scaly).

EASTERN TIBET. Kokonor Region: forest opposite Labrang monastery, alt. 2740 m., nos. 13344, 13345, Dec. 1925 (tree 12–15 m. tall).

This species appears to be common in the forests of southwestern Kansu and to have its northern limits around Labrang in northeastern Tibet and its southern in northwestern Szechuan. In the upper Wantsang valley, lower Tebbu land, Rock states that it forms pure forests with Fir and Birch. It was first reported from Kansu in the neighborhood of Taochau by William Purdom in 1911. In 1925 the Wulsin Expedition also collected it in Kansu.

A well-marked species *P. purpurea* is characterized by its small, violet-purple cones, which vary from 3 to nearly 5 cm. in length. The cone-scales are narrowed abruptly above the middle and are acute or truncate and often erose. The leaves are from 5 to 15 mm. long and from 1 to 2 mm. wide, inclined forward with apex bevelled and obtuse. The collector notes that the leaves vary from deep green to glaucous and that in habit the tree is sometimes pyramidal, at other times spreading, and sometimes the branchlets are drooping. The shoots are usually densely clothed with pale gray spreading villose pubescence, but occasionally as in no. 12985 the pubescence is sparse. The winter buds are small, broadly ovoid to subglobose, shining chestnut-brown to purplish brown. It was discovered around Sungpang ting in 1903 by E. H. Wilson and introduced into cultivation by him in 1910. In the Arnold Arboretum this Spruce has proved perfectly hardy but of slow growth.

*Keteleeria Davidiana* Beissner, Handb. Nadelholzk. 424, fig. 117 (1891).—Rehder & Wilson in Sargent, Pl. Wilson. II. 39 (1914).—Wilson in Jour. Arnold Arb. VII. 53 (1926), where full account of the literature and synonymy is given.

WESTERN SZECHUAN. South of Ching chuan, dry slopes near San Ko shi, alt. 900 m., nos. 12027, 12056, March, 1925 (tree 7.5–18 m. tall).

*Abies Faxoniana* Rehder & Wilson in Sargent, Pl. Wilson II. 42 (1914). Dallimore & Jackson, Handb. Conif. 98, fig. 16 (1923).—Rehder in Bailey,



Cult. Evergreens, 253 (1923).—Florin in Meddel. Göteborgs Bot. Trädgård, III. 1 (Pl. Sin. XVII. 1) (1927).

**SOUTHWESTERN KANSU.** **Tao River basin:** Choni district, Maerhku valley, alt. 3050 m., nos. 13425, 13429, Oct. 1925 (tree 18–24 m. tall, cones purplish black); Maerhku valley, northern slopes of Minshan, alt. 3050 m., nos. 13422, 13423, Oct. 1925 (tree 12–30 m. tall, branches ascending); Mt. Kwang ke, northern slopes of Minshan, alt. 3350 m., no. 14646, Aug. 26, 1926 (tree 7.5–9 m. tall); upper Laluku, near summit of Mt. Lissedzadza, alt. 3350–3650 m., nos. 14929, 12661, July 6 and Oct. 19, 1926 (tree 12–18 m. tall, forming pure stands). **Lower Tebbu country:** summit of spur dividing Mayaku from Sambaku, alt. 3440 m., nos. 14768, 14809, Sept. 1926 (tree 4.5–18 m. tall); valley of Chulunga gapu, forests of Wantsang ku, alt. 3050 m., nos. 14989, 15009, 15044, Sept.–Oct. 1926 (tree 12–30 m. tall). **Upper Tebbu country:** Tsaluku valley, in front of Shimen, alt. 3200 m., nos. 12989, 12990, Aug. 1925 (tree 12–15 m. tall); forests, southern slopes of Minshan, alt. 2920 m., no. 12539, June 1925, (tree 24–27 m. tall, drooping branches); valley of the great Shimen, en route to Koang Kei, no. 12984, Aug. 1925 (tree 15–18 m. tall); forests below Panrukika, en route to Szechuan-Kansu border; alt. 3350 m., nos. 12965, 12987, 15081, 15082, Aug. and Oct. 1926 (tree 12–18 m. tall); between Drjakana and Pandrukika, alt. 2920 m., no. 15084, Oct. 1926 (tree 9–12 m. tall); Drjakana, alt. 3050–3350 m., nos. 12979, 12981, 12994, 13437, 13440, 13444, 13445, Aug., Oct. and Nov. 1925, (tree 15–45 m. tall, bark, pale brown, longitudinally furrowed, branches short, descending, trunk slender, cones bluish black); forests of Drjakana, opposite Lassungomba, no. 13436, Nov. 1926 (tree 18 m. tall); North Tebbu land Koang Kei shan, alt. 3200–3650 m., nos. 13447, 13448, Nov. 1925 (tree 12–15 m. tall).

**CENTRAL KANSU.** **Lien ho a shan:** alt. 3800 m., no. 13466, Oct. 1925 (tree 30–45 m. tall, cones dark purplish black).

From the large number of specimens collected by Rock this species would appear to be common on the mountains of the southern half of Kansu with its northern limits in the central part of that province. The type locality is the mountains northeast of Sungpang-ting and its southern limits the Pan lan shan range west of Kuan Hsien. Its type locality would, therefore, represent about the centre of its distribution. The cones vary greatly in the quantity of resin present, those from the Kansu-Szechuan border being very resinous, whereas specimens from Maerhku on the northern slopes of the Minshan are almost entirely without resin. The winter buds are always very resinous. It is distinguished from the closely related and equally common *A. sutchuenensis* Rehd. & Wils. by its lesser branchlets being clothed with a short, red-brown pubescence and by its usually large cone. The resin-ducts in both species are median.

In Kansu this species was first found near Kagobo by F. N. Meyer on October 30, 1914. By a slip of the pen my colleague, Alfred Rehder,



in his enumeration of "The Ligneous Plants of Northern China" (in Jour. Arnold Arb. iv. 124 (1923) refers Meyer's specimen to *A. Fargesii* Franch. *Abies Faxoniana* was discovered and introduced into cultivation in 1910 by E. H. Wilson from the forests northwest of Sungpang-ting. Although it has proved quite hardy in the Arnold Arboretum it has grown slowly and does not appear to take kindly to cultivation in Massachusetts.

*Abies sutchuenensis* Rehder & Wilson in Sargent, Pl. Wilson. II. 48 (1914).—Dallimore & Jackson, Handb. Conif. 132 (1923).—Rehder in Jour. Arnold Arb. iv. 124 (1923); in Bailey, Cult. Evergreens, 253 (1923).

*Abies Fargesii* var. *sutchuenensis* Franchet in Jour. de Bot. XIII. 256 (1899).

**SOUTHWESTERN KANSU.** **Tao River basin:** Choni district, Maerhku valley, alt. 2890–3350 m., nos. 12940, 12939, 14904, July 1925, Aug.–Sept. 1926 (tree 7.5–15 m. tall); mountains of Choni, west of Tao ho, alt. 3050 m., no. 12145, May 1925, (tree 21–24 m. tall); east of Adjuan, Hsiaoku gorge, alt. 2890 m., no. 12658, July 5, 1925 (tree 15–18 m. tall, trunk rough and scaly); upper Laluku, alt. 3050 m., nos. 14930, 14931, 14932, Oct. 1926 (tree 12–15 m. tall, trunk pale brown, longitudinally furrowed, horizontal branches); Mt. Kwang ke, northern slopes of Minshan, alt. 3350–3650 m., nos. 14635, 14648, Aug. 26, 1926 (tree 6–12 m. tall, fruits blackish blue). **Lower Tebbu Country:** Upper Want-sang valley, alt. 3050 m., nos. 14837, 15020, Sept.–Oct. 1926 (tree 7.5–30 m. tall, fruits purplish black); Chatseti gorge, below Tsarekika, eastern Minshan range, alt. 2920 m., no. 14865, Sept. 17, 1926 (tree 12–18 m. tall). **Upper Tebbu Country:** Tsaluku valley, in front of Shimen, alt. 3200 m., no. 12988, Aug. 1, 1925 (tree 12 m. tall, branches ascending); forests, southern slopes of Minshan, alt. 3261 m., no. 12983, Aug. 1925 (tree 15–18 m. tall, bark greyish brown, longitudinally furrowed); Tougwa camp, slopes of Minshan, alt. 2980, nos. 12541, 12542, 12547, June 1925 (tree 24–30 m. tall, bark flaky, greyish-brown); Lissedzadza, East Tebbu country, alt. 3650 m., no. 13456, Nov. 1925 (tree 9–12 m. tall, cones blackish purple); Mt. Kwang ke, northern slopes of Minshan, alt. 3500 m., no. 15079, Sept.–Oct. 1926 (tree 6 m. tall); Drjakana, alt. 3050–3350 m., nos. 12970, 12972, 12973, 12976, 12977, 12978, 13450, 13451, 13454, Aug.–Nov. 1925 (tree 18–60 m. tall, bark brown, in regular square scales, longitudinally furrowed, branches short, stout, drooping, cones purplish-black); forests of Djrakana, opposite Lassungomba, alt. 3050 m., no. 13435, Oct. 1925 (tree 24–30 m. tall).

**CENTRAL KANSU.** **Lien hoa shan:** between Taochow and Titao, alt. 3050 m., nos. 12678, 12692, 13467, July and Oct. 1925 (tree 7.5–30 m. tall).

The perfectly glabrous branchlets serve to distinguish this species from the closely related *A. Faxoniana* Rehd. & Wils. and as a rule the cone is smaller. Another related species, *A. Fargesii* Franch., which also has glabrous branchlets is distinguished by its much longer, relatively thinner and wider leaves in which the resin-ducts are lateral. *A. sutchuenensis*



is evidently a common species in southwestern Kansu, yet so far it has not been recorded from the adjacent region of northwestern Szechuan. The type locality is the mountains of eastern Szechuan. The specimens collected in Shensi by Purdom (no. 405) and by Rehder & Wilson (in Pl. Wilson. II. 49 (1914)) doubtfully referred to this species belong to *A. Fargesii* Franch.

*Abies recurvata* Masters in Jour. Linn. Soc. XXXVII. 423 (1906).—Rehder & Wilson in Sargent, Pl. Wilson. II. 44 (1914).—Rehder in Bailey, Cult. Evergreens, 254, (1923).—Dallimore & Jackson, Handb. Conif. 129 (1923).

**SOUTHWESTERN KANSU. Upper Tebbu country:** Yiwaku, between Drakana and Boho gomba, alt. 2890 m., no. 15087, Oct. 1926 (tree 15–24 m. tall, cone dull grey-brown, 8.75 cm.); Yiwaku, between rock gate and Boho gomba, alt. 2740 m., no. 15088, Oct. 1926 (tree 18–24 m. tall, cone dull black, densely grey pubescent).

Mr. Rock's material is the first record of this species of Silver Fir from the province of Kansu, where it would appear to be rare. The type locality is the mountains to the south and west of Sungpang-ting, northwestern Szechuan, where it forms extensive and nearly pure forests. It was discovered in 1903 by E. H. Wilson and by him introduced into cultivation in 1910. In the Arnold Arboretum it has proved perfectly hardy, has grown moderately fast and promises to be a very useful ornamental tree.

*Abies chensiensis* Van Tieghem in Bull. Soc. Bot. France, XXXVIII. 413 (1891).—Franchet in Jour. de Bot. XIII. 256 (1899).—Rehder & Wilson in Sargent, Pl. Wilson. II. 44 (1914).—Rehder in Jour. Arnold Arb. IV. 124 (1923); in Bailey, Cult. Evergreens, 254 (1923).—Dallimore & Jackson, Handb. Conif. 93, (1923).

*Abies* sp. Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 100 (Pl. David. I. 290) (1884).

*Abies firma* Masters in Jour. Linn. Soc. XXVI. 557 (1902), as to the specimen from Shensi.—Non Siebold & Zuccarini.

**SOUTHWESTERN KANSU. Lower Tebbu country:** Wantsang valley, alt. 2135–2375 m., no. 14831, Sept. 1926 (tree 30–45 m. tall, bark drab colored, longitudinally furrowed).

This is the first record of the occurrence of this rare and interesting Silver Fir in Kansu. Discovered on the Tsin-ling Mountains in Shensi by Père A. David in 1872, it was introduced into cultivation by E. H. Wilson who collected seeds on the mountains of western Hupeh in the autumn of 1907. In the Arnold Arboretum this Silver Fir has proved perfectly hardy, has grown fairly rapidly and promises to be a useful ornamental tree.

*Cunninghamia lanceolata* Hooker in Bot. Mag. LIV. t. 2743 (1827).—Rehder & Wilson in Sargent, Pl. Wilson. II. 50 (1914).—Rehder in Jour. Arnold Arb. IV. 23 (1923).—Wilson in Jour. Arnold Arb. VII. 57 (1926).



NORTHEASTERN YUNNAN. Tung chuan, temples, alt. 3000 m., nos. 12000, 12005, Dec. 1924, Jan. 1925 (tree 24 m. tall).

In the warmer parts of China this is one of the most common coniferous trees.

*Cryptomeria japonica* D. Don in Trans. Linn. Soc. xviii. 166, t. 13, fig. 1 (1841).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 52 (1914).—Wilson, Conif. & Tax. Jap. 66, tt. 48–49 (1916), where complete references to the literature and synonymy will be found.—Rehder in Jour. Arnold Arb. iv. 125 (1923).—Wilson in Jour. Arnold Arb. vii. 59 (1926).

NORTHEASTERN YUNNAN. Without locality, no. 12001, Dec. 1924 (tree 24 m. tall).

*Cupressus Duclouxiana* Hickel in Camus, Cypres, 91, t. 3, figs. 419–424 (1914).—Dallimore & Jackson, Handb. Conif. 195 (1923).—Stapf in Bot. Mag. CL. t. 9049 (1925).—Wilson in Jour. Arnold Arb. vii. 60 (1926).—Florin in Meddel. Göteborgs Bot. Trädgård, iii. 3 (Pl. Sin. xvii. 3) (1927).

*Cupressus sempervirens* Franchet in Jour. de Bot. xiii. 263 (1899).—Non Linnaeus.

*Cupressus torulosa* Rehder & Wilson in Sargent, Pl. Wilson. ii. 54 (1914), excluding all references and synonyms.—Hayata in Tokyo Bot. Mag. xxxi. 118 (1917).—Chun, Chin. Econ. Trees, 38, fig. 12 (1922).—Rehder in Jour. Arnold Arb. iv. 125 (1923).—Non D. Don.

SOUTHERN KANSU. Between Kaichow and Minchow on Wuto ho, beyond granite gorge, no. 12073, April 1925 (tree 12–15 m. tall).

*Juniperus formosana* Hayata in Jour. Coll. Sci. Tokyo, xxv. art. xix. 209, t. 38 (Fl. Mont. Formosa) (1908).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 56 (1914).—Rehder in Jour. Arnold Arb. iv. 126 (1923).—Wilson in Jour. Arnold Arb. vii. 63 (1926), where a full account of the literature and synonymy is given.—Florin in Meddel. Göteborgs Bot. Trädgård, iii. 3 (Pl. Sin. xvii. 3) (1927).

SOUTHWESTERN KANSU. Tao River basin: Mountains of Choni, alt. 2860 m., no. 12102, May 1925 (tree 3 m. tall); river bank, between Choni and Kadjaku, alt. 2590 m., no. 13432, Oct. 1925 (tree 3–4.5 m. tall); shale slopes outskirts of Choniku, alt. 2590–2740 m., no. 14934, Oct. 20, 1926 (tree 4.5 m. tall); Minshan range, along Kwadjaku stream, near Tatsuto, alt. 2740 m., no. 12430, June 1925 (tree 9–12 m. tall).

Mr. Rocks states the fruits are bluish-black or black, but this is evidently the color before they are ripe. At maturity the fruits are brownish orange and slightly bloomy.

*Juniperus squamata* Lambert, Descr. Gen. Pinus, ii. 17 (1824).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 57 (1914).—Wilson in Jour. Arnold Arb. vii. 64 (1926), where a full account of the literature and synonymy is given.

*Juniperus Franchetiana* Lévillé, Cat. Pl. Yunnan. 57 (1915–16), nomen nudum.

The material collected by Mr. Rock belongs to the following variety:

*Juniperus squamata* var. *Fargesii* Rehder & Wilson in Sargent, Pl. Wilson. ii. 59 (1914).—Rehder in Jour. Arnold Arb. iv. 126 (1923).—Wilson in Jour. Arnold Arb. vii. 65 (1926).



*Juniperus saltuaria* Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 65, no. 40677 (1918).—Non Rehder & Wilson.

*Juniperus Fargesii* Komarov in Herb. Mus. Paris (1911); in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross. v. 30 fig. 2, (1924).

*Juniperus kansuensis* Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross. v. 31, fig. 1 (1924).

*Sabina kansuensis* Komarov, l. c., synonym.

**SOUTHWESTERN KANSU.** Lower Tebbu country: Mayaku, upper right branch, alt. 2890 m., no. 15066, Sept.–Oct. 1926 (tree 7.5–9 m. tall); forests of Ngongo, valley of Chulungapu, alt. 2890 m., no. 15093, Oct. 1926 (tree 7.5–9 m. tall). Upper Tebbu country: Djrakana, alt. 3050 m. no. 13470, Oct. 1925 (tree 6–9 m. tall).

We have in this herbarium an excellent photograph of the type of Komarov's *Juniperus kansuensis* and also F. N. Meyer's specimen, no. 1827, cited as a co-type by Komarov. The seed in the Meyer specimen is larger than that figured for *Juniperus kansuensis* and slightly smaller than that figured for *Juniperus Fargesii*. I do not think the difference is sufficient to separate this as a species distinct from the polymorphic *Juniperus squamata* Lamb.

*Juniperus squamata* f. *Wilsonii* Rehder in Jour. Arnold Arb. i. 191 (1920); in iv. 126 (1923), where a full account of the literature and synonymy is given.

**SOUTHWESTERN KANSU.** Lower Tebbu country: Upper Mayaku valley, alt. 2740 m., no. 14757, Sept. 6, 1926 (tree 4.5–6 m. tall).

*Juniperus Przewalskii* Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross. v. 28, fig. 11 (1924).—Florin in Meddel. Göteborgs Bot. Trädgård, III. 10, t. 4, fig. 3-a, 3-b (Pl. Sin. XVII. 10) (1927).

*Juniperus pseudosabina* Komarov in Act. Hort. Petrop. XXXIV. 118, 119, 135 (1920).—Non Fischer & Meyer.

*Sabina Przewalskii* Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross. v. 28, (1924), synonym.

**EASTERN TIBET.** Radja and Yellow River gorges: on mossy rocks in Howa valley, one stage north of Radja, alt. 3740 m., no. 14044 May 31, 1926 (tree 4.5–6 m. tall).

The markedly dimorphic foliage, the bloomy black, plum-like, globose fruit and globose, sculptured seed would appear to distinguish this species.

*Juniperus zaidamensis* Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross. v. 29, fig. 10 (1924).

*Juniperus pseudosabina* Komarov in Act. Hort. Petrop. XXXIV. 118, 119, 125 (1920).

*Sabina zaidamensis* Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross., v. 28 (1924), synonym.

**NORTHWESTERN KANSU.** Richthofen range and adjacent region: northern slopes of N. Kokonor barrier range; in deep gorge or rocky slopes, alt. 3350 m., no. 13305 Oct. 1925 (tree 7.5–12 m. tall).

The roughly sculptured, globose seed, often slightly depressed at the summit, is characteristic of this species.



***Juniperus tibetica*** Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross. v. 27, fig. 9 (1924).—Florin in Meddel. Göteborgs Bot. Trädgård, III. 10, t. 1, fig. 4-a, 4-b (Pl. Sin. xvii. 10) (1927).

*Sabina tibetica* Komarov in Notul. Syst. Herb. Hort. Bot. Reipubl. Ross., v. 27, (1924), synonym.

**EASTERN TIBET.** **Radja and Yellow River gorges:** Rocky slopes of Yellow River gorges between Nyavruich and Howa canyons, also Dachso canyon, alt. 3440 m., no. 13946, May 27, 1926 (tree 6 m. tall). **Jupar Range:** Upper Jupar valley, rocky slopes, alt. 3700 m., no. 14302, June 27, 1926 (tree 9–12 m. tall, trunk 3.5 ft.).

In this species the seed varies from broadly-ovoid to globose and is roughly sculptured. In spite of the differences in the shape of the seed I think it is doubtful if this and *Juniperus zaidamensis* Komarov are really distinct species. Moreover, it appears highly probable to me that these and also *Juniperus Przewalskii* Komarov are forms and conditions of one variable species.

***Juniperus distans*** Florin in Meddel. Göteborgs Bot. Trädgård, III. 6, t. 3, figs. 1, 2-a, 2-b (Pl. Sin. xvii. 6) (1927).

**SOUTHWESTERN KANSU.** **Tao River basin:** Kwadjaku stream on limestone rocks, no. 12472, June 1925 (tree 9–12 m. tall). **Lower Tebbu country:** forests in upper Mayaku, alt. 2740–2930 m., nos. 14774, 14875, Sept. 1926 (tree 9–15 m. tall, trunk 0.3 to 1. m.); mouth of Tayuku and Hsiaoku at Adjuan, alt. 2740 m., no. 14864, Sept. 1926 (tree 10.5–12 m. tall, trunk 0.3 m.). **Upper Tebbu country:** Kuang kei shan, Tebbu country, alt. 3650 m., no. 13469, Oct. 1927 (tree 7.5–9 m. tall).

The subglobose to ovoid or slightly oblong-ovoid, pruinose fruit and ovoid to obovoid, often apiculate, slightly sculptured seed appears to distinguish this species.

***Juniperus glaucescens*** Florin in Meddel. Göteborgs Bot. Trädgård, III. 5, t. 4, figs. 1, 2-a, 2-b (Pl. Sin. xvii. 5) (1927).

**EASTERN TIBET.** **Grasslands between Labrang and Yellow River:** arid slope in Gochen valley near Yellow River gorge, south of Dzangar, alt. 3110 m., nos. 13913, 13918, May, 1926 (tree 6.8–15 m. tall, trunk 1 m. in diameter).

This species is closely related to *Juniperus distans* but has a somewhat smaller, more globose fruit and usually obovoid seed. However, they are certainly very closely related. Indeed, the same may be said of the several heterophyllous, large-fruited, monospermous, arborescent species of *Juniperus* found in Kansu and eastern Tibet and recently described by Komarov and Florin.

***Juniperus saltuaria*** Rehder & Wilson in Sargent, Pl. Wilson. II. 61 (1914).—Rehder in Jour. Arnold Arb. IV. 128 (1923).—Florin in Meddel. Göteborgs Bot. Trädgård, III. 3 (Pl. Sin. xvii. 3) (1927).



**SOUTHWESTERN KANSU.** **Tao River basin:** Mountains of Tao River valley, alt. 3050 m., nos. 12258, 12396, 12646, June-July, 1925 (tree 4.5-9 m. tall). **Lower Tebbu country:** Between Mayaku and Chatseti, alt. 3350-3410 m., nos. 14771, 14868, Sept. 1926 (tree 6-9 m. tall, trunk 1 ft.). **Upper Tebbu country:** Kuang kei shan, Eastern Tebbu land, alt. 3650 m., nos. 13468, 13471, Oct. 1925 (tree 6-12 m. tall).

*Juniperus chinensis* Linnaeus, Mant. 127 (1767).—Miquel in Ann. Mus. Lugd.-Bat. III. 167 (1867); Prol. Fl. Jap. 331 (1867); in Siebold & Zuccarini, Fl. Jap. II. 58, t. 126, 127, fig. 1, 2, 4 (1870).—Rehder & Wilson in Sargent, Pl. Wilson. II. 60 (1914), where a full account of the literature and synonymy is given.—Rehder in Jour. Arnold Arb. IV. 127 (1923).—Wilson in Jour. Arnold Arb. VII. 67 (1926).

**SOUTHWESTERN KANSU.** **Lower Tebbu country:** At Pezku, on banks of Peshwekiang, alt. 2141 m., no. 14562, Aug. 1926 (tree 12-15 m. tall, round crown); Pezhu, on banks of Chulungapu, the Tan shiang mu, nos. 14952, 14952-A, Sept.-Oct. 1926.

*Juniperus chinensis* var. *pendula* Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 101 (Pl. David. I. 291) (1884).—Rehder in Jour. Arnold Arb. IV. 128 (1923).

**SOUTHWESTERN KANSU.** **Lower Tebbu country:** Banks of Chulungapu, no. 14951, Sept.-Oct. 1926 (tree 12-18 m. tall, branches long, slender, bright green, branchlets drooping).

✓ *Juniperus chinensis* var. *arenaria* Wilson, var. nov.

Frutex circiter 30 cm. altus, ramis patentibus basi plerisque decumbentibus, apice ascendentibus, ramulis satis congestis erectis vel suberectis: folia adpressa vel arcte adpressa, opposita, in ramis primariis terna, ovato-lanceolata, 3-4 mm. longa, acuminata, pungentia, glandula resinifera conspicua, ad basin ramulorum ovata, 1-2 mm. longa, acutiuscula vel breviter acuminata.

**EASTERN TIBET.** **Kokonor Region:** sand-dunes of Kokonor and along main lake on high dunes, alt. 3350 m., no. 13346, Sept. 1925 (shrub 0.3 m. high).

This is a low-growing, spreading variety with ascending branches and distinct appearance. The branchlets are densely crowded with appressed, sharp-pointed leaves which lower down merge into shorter more scale-like leaves. On the dorsal surface the resin-gland is usually prominent. The 2-4 seeded fruit is typical of *J. chinensis* L.

## LILIACEAE

Determined by A. REHDER

*Smilax trachypoda* Norton in Sargent, Pl. Wilson III. 3 (1916).—Rehder in Jour. Arnold Arb. IV. 131 (1923).



SOUTHWESTERN KANSU. Lower Tebbu country: Wantsang valley, alt. 2300 m., no. 14722 (erect shrub 1.50–1.75 m., in dense shade of forests) and no. 14833 (shrub 1–1.25 m., outskirts of forests), Sept. 1926.

In Rock's specimens the rough papillate pubescence on the petiole and veins is often only slightly developed.

✓ *Smilax rubriflora* Rehder, sp. nov.

Frutex scandens ramis ramulisque inermibus teretibus vel ramulis ultimis leviter angulatis, ramulis geniculatis. Folia disticha, decidua, ovato-elliptica ad 2–4 cm. longa et 1.2–2.5 cm. lata (in specimine florente nondum matura et minora), obtusa et mucronulata, rarius acuta, basi rotundata vel subito in basin late cuneatam contracta, trinervia vel interdum 5-nervia pari laterali inconspicuo, rete venularum subtus elevato, glabra, luteoviridia, subtus glaucescentia; petioli 6–10 mm. longi, graciles,  $\frac{1}{2}$ – $\frac{2}{3}$ -vaginati, alis angustis costatis, cirrhifera, in ramulis robustis sterilibus ad 2.5 cm. longi et cirrhii longissimis, in ramulis ultimis floriferis saepe cirrhii debilibus vel ecirrhosi. Inflorescentiae axillares, pedunculis petiolo longiores, plerumque una tantum ad basin ramulorum; flores masculi intense rubri, in umbellis 3–6-floris graciliter pedunculatis pedunculo filiformis 7–12 mm. longo; pedicelli ebracteati, 5–8 mm. longi, filiformes; sepala ovato-lanceolata, circiter 2 mm. longi, patentia vel reflexa, intense rubra ("dark red" sec. coll.); stamina 6, segmentis multo breviora, antheris suborbicularibus albidis circiter 0.5 mm. diam., filamentis brevissimis vix 0.5 mm. longis. Baccae 1–6, graciliter pedicellatae, in umbellis graciliter pedunculatis, globosae, 5–8 mm. diam., 1–3 spermae, nigrae vix vel levissime pruinosa; semina subglobosa, 3 mm. diam.

SOUTHWESTERN KANSU. Upper Tebbu country: southern slopes of Minshan, along banks of mountain streams, alt. 3200 m., no. 12506, June 1925 (woody climber, flowers dark red; type). Lower Tebbu country: in streambed of Wantsang valley, alt. 2130 m., no. 14676, Sept. 1, 1926 (climber over shrubs); Mayaku, alt. 2900 m., no. 15067, Sept.–Oct. 1926 (rambling shrub, fruit black, in small umbels).

This new species differs from all the Chinese species known to me in its dark red flowers. It appears to be most nearly related to *S. vaginata* DCne. which agrees in its slender inflorescence, small flowers, suborbicular anthers and short filaments and in its unarmed stems, but its flowers are yellowish or brownish yellow, it is totally different in its habit, being an upright or perhaps sometimes rambling shrub without tendrils and its leaves are larger, distinctly ovate with a broad, truncate or subcordate base. Those, however, of the upper leaves of the smaller branchlets of *S. rubriflora* which have no tendrils differ very little from the leaves of *S. vaginata*. The new species has also some resemblance to *Smilax glauco-china* Warb., but that species is easily distinguished by its larger greenish flowers, with the stamens nearly as long as the sepals, by the



many-flowered umbels, the bloomy fruits and the glaucous or glaucescent under side of the larger leaves.

### SALICACEAE

The enumeration of the species of *Populus* and *Salix* will appear in a later issue.

### JUGLANDACEAE

Determined by A. REHDER

*Pterocarya stenoptera* C. De Candolle in Ann. Sci. Nat. sér. 4, xviii. 34 (1862).—Lavallée, Icon. Arb. Segrez. 65, t. 19 (1885).—Rehder & Wilson in Sargent, Pl. Wilson. iii. 181 (1916), where full citation of literature and synonyms is given.—Rehder in Jour. Arnold Arb. iv. 146 (1923).

SOUTHERN KANSU: beyond Pi kou along banks of Wen hsien ho, alt. 900 m., no. 12079, April 1925 (tree 12 m.).

This species which is distributed throughout the whole of China, except the extreme northeast, and extends into Tonkin is apparently rare in Kansu and only found in the southern part of that province where it had been collected before by P. J. Piasezki.

### BETULACEAE

Determined by A. REHDER

*Ostryopsis Davidiana* Decaisne in Bull. Soc. Bot. France, xx. 155 (1873).—Lavallée, Icon. Arb. Segrez. 5, t. 3 (1880).—Schneider in Sargent, Pl. Wilson. ii. 423 (1916), where full citation of literature and synonymy is given.—Rehder in Jour. Arnold Arb. iv. 149 (1923).

SOUTHWESTERN KANSU. Tao River basin: banks of Tao ho, east of Choni, alt. 2530, nos. 12219, June 1925 (shrub 1.25–1.5 m.); among rocks and boulders along the river, below Choni, alt. 2450 m., no. 12799, June–July 1925 (shrub 1.75–2 m.); on rocky banks of river, Choni district, no. 13513, Oct. 1925 (shrub 1 m.).

This species had been collected before in Kansu by P. J. Piasezki and by R. C. Ching collector on the Wulsin Expedition.

*Corylus Sieboldiana* Bl. var. *mandshurica* Schneider in Sargent, Pl. Wilson. ii. 454 (1916), where full citation of literature and synonymy is given.—Rehder in Jour. Arnold Arb. iv. 153 (1923).

*Corylus mandshurica* Maximowicz & Ruprecht in Bull. Acad. Sci. St. Pétersb. xv. 137 (1856); in Mém. Biol. ii. 431 (1857).—Skan in Bot. Mag. cxli. t. 8628 (1915).

SOUTHWESTERN KANSU. Tao River basin: banks of Tao River, east of Choni, alt. 2530 m., no. 12212, June 1925 (shrub 2–2.25 m.); Tao ho road to Poyüku, alt. 2750 m., no. 13511, Oct. 1925 (shrub 3 m.).

CENTRAL KANSU. Lien ho a shan: scrub forest, northern slope, above Shan shen miao, alt. 2900 m., no. 13214, Aug. 1925 (shrub 3–4.5 m.).

This species had been collected before in Kansu by R. C. Ching who accompanied the Wulsin Expedition.



*Betula albo-sinensis* Burkill in Jour. Linn. Soc. xxvi. 497 (1899).—Diels in Bot. Jahrb. xxix. 282 (1900).—Schneider in Sargent, Pl. Wilson. II. 457 (1916), with citations of literature and synonyms.—Rehder in Jour. Arnold Arb. iv. 153 (1923).

*Betula utilis* var. *sinensis* Winkler in Engler, Pflanzenr. iv.-61, p. 62 (1904).

**SOUTHWESTERN KANSU.** **Tao River basin:** grassy slopes and ravines, west of Adjüan, alt. 3050–3500 m., nos. 12609, 12632, July 5–10, 1925 (small tree or shrub, 7–8 m.); limestone cliffs of Shiao ku, beyond Adjüan, alt. 2900 m., no. 12811, July 1925 (shrub or tree 4.5–5 m.); mountains west of Adjüan, east Tebbu land, alt. 3200 m., no. 13621, Sept.–Oct. 1925 (shrub or small tree 4.5–5.5 m.). **Upper Tebbu country:** in crevices of limestone walls, southern slopes of Minshan, alt. 3500, no. 12526, June 1925 (shrub 2–3 m., with long drooping branches); among boulders at foot of Shimen, alt. 3600 m., no. 13080, July–Aug. 1925 (tree 7 m., bark glossy, copper-colored); rocky slopes of Djrakana, alt. 3200–3350 m., no. 13641, Sept.–Oct. 1925 (tree 7–8 m., strobiles brown); Hsiao ku, along stream, northeast of Adjüan, east Tebbu land, alt. 3200 m., no. 13646, Sept.–Oct. 1925 (tree 12–15 m.; strobiles brown); forest at Pandrukika pass, border of Tebbu and Szechuan, alt. 3050–3350 m., no. 15083, Oct. 1926 (tree 3–4.5 m., bark red). **Lower Tebbu country:** only in upper regions with Fir, alt. 3450, no. 14772, Sept. 7, 1926 (tree 7–10 m., trunk 30 cm. diam., bark greyish black). **CENTRAL KANSU.** **Lien ho a shan:** in Spruce forests and outskirts between Tao chow and Titao, alt. 3050 m., no. 12732, July 14–20, 1925 (tree 4.5–5.5 m.); alt. 3020 m., no. 13616, Oct. 1925 (tree 7.5–9 m.).

*Betula albo-sinensis* var. *septentrionalis* Schneider in Sargent, Pl. Wilson. II. 458 (1916).—Rehder in Jour. Arnold Arb. iv. 154 (1923).

**SOUTHWESTERN KANSU:** **Lower Tebbu country:** common tree in upper Wantsang forest, alt. 2450–2600 m., no. 14709, Sept. 3, 1926 (tree 18 m., bark copper-color with short white lines); forming pure forests with Spruces and Firs, alt. 2900 m., no. 14823, Sept. 11, 1926 (tree 18–25 m., trunk 30–60 cm. diam., bark red); Ngongo gorges with Firs and Spruces, alt. 2800–3000 m., nos. 14966, 14969, Oct. 1926 (tree 10–25 m., trunk up to 60 cm. diam., bark red). **Upper Tebbu country:** Tatsuto, Kadjaku valley, west Tebbu, Minshan, alt. 2800 m., no. 13648, Sept.–Oct. 1925 (tree 15–18 m.).

Schneider distinguishes this variety from the type by the more or less distinctly glandular branchlets and the more distinctly silky-pubescent midrib and veins. To these characters may be added the generally oblong-ovate shape of the leaves, usually ovate or sometimes broadly ovate in the type, and the greater height of the tree; according to Rock's notes the type is often only a shrub or at best a small tree up to 10 m. high, while the variety is always a tree, 10–25 m. tall with a trunk up to 60 cm. in diameter. The type seems to occur chiefly at altitudes of



3050 and 3500 m., while the variety is found at lower altitudes of between 2450 and 3000 m. Both, the type and the variety, have been collected before in Kansu by W. Purdom, F. N. Meyer and R. C. Ching.

*Betula Delavayi* Franchet in Jour. de Bot. XIII. 205 (1899).—Winkler in Engler, Pflanzenr. IV.-61, p. 67, fig. 19 m. (1904).—Schneider in Sargent, Pl. Wilson. II. 460 (1916).—Rehder in Jour. Arnold Arb. IV. 154 (1923).

SOUTHWESTERN KANSU. Lower Tebbu country: in Spruce forests in upper Mayaku, alt. 2750 m., no. 14758, Sept. 6, 1926 (tree 4.5–6 m., with horizontal branches).

This very distinct small-leaved Birch seems to have been collected in Kansu only once before by W. Purdom near Lotani, Minchow district.

*Betula japonica* Sieb. var. *szechuanica* Schneider in Jour. Arnold Arb. III. 454 (1917).

*Betula japonica* Sieb. var. *mandshurica* Schneider, op. cit. II. 461 (1916).

SOUTHWESTERN KANSU. Tao River basin: mountains of Choni, in scrub forest, below Spruce forest, alt. 3050 m., no. 12118, May 1925 (tree 6–7 m., bark white); mountains of Choni, outskirts of Spruce forests, alt. 3200 m., no. 12129, May 1925 (tree 7 m., branches slender, erect, ends drooping, bark white); common in lower forests, outskirts of Spruce forests, alt. 2750 m., no. 12301, June 1925 (tree 9–12 m., bark smooth copper colored [?], leaves bright green); Minshan range, forming forests around Pine forests on grassy banks of Kwadjaku stream, no. 12434, June 1925 (tree 15–18 m.); west of Choni, outskirts of Pine forests at Tatsuto, alt. 2600 m., no. 12477, June 1925 (tree 18–24 m.); Poyuku, on forest slopes, alt. 3050 m., no. 13657, Sept.–Oct. 1925 (tree 9–12 m.); in loess on banks of river, alt. 2600 m., no. 14916, Oct. 20, 1926 (tree 18 m., trunk 60–90 cm. diam., dark silvery gray to blackish). Lower Tebbu country: forest of lower Wantsang valley, alt. 2130 m., no. 14718, Sept. 3, 1926 (tree 12 m., trunk 30–60 cm. diam., bark with white and black rings); forest back of Wantsang monastery, alt. 2750 m., no. 14805, Sept. 1926 (tree 7–9 m.; bark yellowish white); on steep slopes of lateral valley near camp in Wantsang valley, alt. 2800 m., no. 14818, Sept. 11, 1926 (tree 15–18 m., bark greyish black), slopes of Wantsang valley, alt. 2750 m., no. 14820, Sept. 11, 1926 (tree 9–12 m.; bark pale yellow); forests of Wantsang valley, alt. 2300 m., no. 14824, Sept. 11, 1926 (tree 12–15 m., bark whitish); on top of ridges and spurs, Wantsang valley, alt. 2900 m., no. 15017, Sept.–Oct. 1926 (tree 9–12 m., bark greyish pink to dark grey); Wantsang ku, alt. 2600 m., no. 15018, Sept.–Oct. 1926 (tree 12–15 m., bark flesh color). Upper Tebbu country: mountains west of Adjüan, east Tebbu land, alt. 3200 m., no. 13644, Sept.–Oct. 1925 (tree 9–10 m., bark red, copper-colored).

EASTERN TIBET. Radja and Yellow River gorges: with Juniper and Spruce, alt. 3350 m., no. 13952, May 25, 1926 (tree 4.5–6 m.);



northern slopes of Yellow River, south of and opposite Radja, alt. 3200 m., no. 13962, May 24, 1926 (tree 4.5–6 m.); lateral valley of Yellow River gorges, north of Radja, alt. 3200 m., no. 14034, May 28, 1926 (tree 4.5–6 m., bark pinkish); in and on outskirts of Spruce forest in Dachso canyon, alt. 3200 m., no. 14072, June 3, 1926 (tree 6–7.5 m., bark pinkish to flesh color). **Jupar Range:** gravelly slopes, with Willows, alt. 3200 m., no. 14290, June 1926 (tree 4.5–6 m., bark bronze color).

This Birch is apparently a common tree in the valleys of southwestern Kansu and the adjoining regions of eastern Tibet. It is often found associated with Coniferous forests and occurs usually on the outskirts of these forests. It grows approximately at the same altitudes as the preceding species, but does not seem to ascend to quite as high altitudes and descends to about 2100 meters. It had not before been recorded from Kansu or eastern Tibet.

Most of the specimens agree well with the type of var. *szechuanica*, others differ in their smaller markedly cuneate and more unequally and often slightly doubly serrate leaves, as no. 14916 from the Tao River basin, nos. 14805, 14818, 14820 and 14824 from the Lower Tebbu country and no. 13644 from the upper Tebbu country. Of no. 12301 from the Tao River basin Rock describes the bark as copper-colored, which is the color of the bark of *B. albo-sinensis*; there is no sample of the bark with the specimen and I assume Rock must have made a mistake. Of no. 12477 there is a good photograph showing the habit of the tree which is much like that of *B. pendula* Roth and of no. 14916 a photograph of the trunk which measures 60–90 cm. in diameter.

✓ ***Betula japonica* var. *Rockii* Rehd., var. nov.**

A typo recedit foliis minoribus rhombico-ovatis 3–4 cm. longis basi late cuneatis rarissime fere truncatis duplicato-serratis et interdum lobulatis, strobilis minoribus, circiter 2 cm. longis, bractearum lobis lateralibus suberectis.

**EASTERN TIBET.** **Kokonor region:** common in Koko gorge, alt. 3350–3500 m., no. 13283, Sept.–Oct. 1925 (tree 6–9 m., crown oblong, pointed, bark silvery gray to blue).

This Birch is apparently nearest related to *B. japonica* var. *szechuanica* from which it differs chiefly in its smaller, cuneate, doubly serrate or even lobulate leaves and in the suberect or ascending lateral lobes of the fruiting bracts, otherwise the bracts and also the seeds agree with those of the type specimen of var. *szechuanica*. In the shape of the leaves the specimen resembles *B. pendula* Roth., but the leaves have fewer veins, generally only four pairs, and the fruiting bracts are quite different, those of *B. pendula* having markedly recurved or at least spreading lateral lobes and a longer stipe; the wings of the seeds are about as wide as the body in var. *szechuanica* and in this new variety, while in *B. pendula* they are about twice as wide. The suberect lobes of the bracts suggest *B. pubescens*



Ehrh., but the shape of the leaves and the glabrous and glandular branchlets do not allow it to be referred to that species.

*Betula luminifera* Winkler in Engler, Pflanzenr. iv.-61, p. 91, fig. 23a-c (1904).—Schneider, Ill. Handb. Laubholz. II. 882, fig. 552d, 553g-h (1912); in Sargent, Pl. Wilson. II. 455 (1916), with citation of literature and synonyms.

WESTERN SZECHUAN: north of Kiang yu, along Fu kiang river, no. 12033, March 1925 (tree 8 m.).

## FAGACEAE

Determined by E. H. WILSON

*Quercus liaotungensis* Koidzumi in Tokyo Bot. Mag. xxvi. 166 (1912); in Matsumura, Icon. Pl. Koisikav. I. 109, t. 55 (1912).—Rehder & Wilson in Sargent, Pl. Wilson. III. 233 (1916).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. xxxix. 101, no. 38181 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 24 (1922).—Rehder in Jour. Arnold Arb. iv. 159 (1923).

*Quercus funebris* var. *undulatifolia* Nakai, Rep. Veg. Quelpaert. Isl. 37 (1914). Name only.

*Quercus mongolica* β. *liaotungensis* Nakai in Tokyo Bot. Mag. xxix. 58 (1915); Fl. Sylv. Koreana III. 24 (1917).

*Quercus undulatifolia* Leveille in Litt. ex Nakai in Tokyo Bot. Mag. xxix. 58 (1915). As a synonym.

*Quercus funebris* Leveille in Litt. ex Nakai l. c. As a synonym.

SOUTHWESTERN KANSU—Lower Tebbu country: Peshwekiang valley, Pezhu, alt. 2280 m., nos. 14568, 14959, 14941, Aug.-Oct. 1926 (tree 9-18 m. tall, crown spreading, trunk 0.3-0.6 m. diam.); Wantsang valley, alt. 2280 m., nos. 14671, 15030, Aug., Sept.-Oct. 1926 (tree 7.5-12 m. tall, crown large, spreading, trunk 0.3-0.6 m. diam.); Mayaku below Zehga, alt. 2280-2590 m., nos. 15075, 15057, 14789, 14788, 15073, Sept.-Oct. 1926 (tree 1.3-12 m. tall, trunk 0.3-0.6 m. diam.); Forests of Tsaoshiku, alt. 2440 m., no. 15002, Sept.-Oct. 1926 (tree 9-12 m. tall); Forests of Ngongo, alt. 2440 m., nos. 14974, 14967, Sept.-Oct. 1926 (tree 9-12 m. tall). Upper Tebbu country: Lower Yiwaku, near Tsaruku, alt. 2370 m., no. 14578, Aug. 28, 1926 (tree 3-4.5 m. tall); Lien hoa shan: Shanshen Miao, Ha Kou stream, alt. 2740-2890 m., nos. 12782, 13222, 13487, 13482, July, Aug., Oct. 1926 (tree 1.8-15 m. tall, trunk 1 m. in diam., acorns sweet, edible).

This is a critical species very closely related to *Q. mongolica* Fischer from which it may be distinguished by its smaller, more shallow cupules and smaller, slightly, if at all, thickened cupule-scales. The leaves are always auricled at the base and vary much in size as does the petiole in length. No. 15073 appears to represent a teratological form with relatively long petioles, narrow-oblong leaves, varying from nearly entire to deeply lobed or even pinnatifid. Such monstrosities are known in other Oaks including the related *Q. robur* L. It would appear to be a tree of no great size widely spread in the more southern half of Kansu.

*Quercus Baronii* Skan in Jour. Linn. Soc. xxvi. 507 (1899).—Seemen in Bot. Jahrb. xxix. 291 (1900).—Rehder & Wilson in Sargent, Pl. Wilson.



III. 226 (1916).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 24 (1922).—Rehder in Jour. Arnold Arb. IV. 163 (1923).

SOUTHWESTERN KANSU—Lower Tebbu country: Peshwekiang valley, Pezhu, alt. 1980–2171 m., nos. 14561, 14686, 14940, 14950, 14942, Aug., Sept., Oct. 1926 (tree 4.5–15 m. tall); Near mouth of Wantsang Ku, alt. 2135 m., no. 15037 Sept.–Oct. 1926; Forests near Nyingo, alt. 2135 m., no. 14995, Sept.–Oct. 1926 (tree 9–12 m. tall).

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## ABNORMAL FRUITS OF JUGLANS NIGRA

ALFRED REHDER

IN 1919 Dr. Fairchild of Washington sent to the Arnold Arboretum some abnormal Walnuts he had received from Mr. J. W. Ray of Greensburg, Indiana, who had gathered them from a tree growing on land of Mr. Wm. H. Cramer, in the same town. With these nuts which were supposed to represent a hybrid between a Hickory and a Walnut photographs were sent showing nuts with and without husk of the supposed hybrid and its parents, *Juglans nigra* and *Carya laciniosa*. In the accompanying letter, however, Mr. Ray doubts the hybrid origin of the tree, since only a small portion of the fruits on the tree are abnormal, and states that the abnormal fruits appear only in those years when the Hickory, which stands at about 200 feet distant in the direction of the prevailing winds, is found to bear, and he, therefore, concludes that these fruits are the result of the direct influence of the Hickory pollen on the *Juglans* flower. This year we received through Mr. Charles C. Deam of Bluffton, Indiana, additional material including branches from the same tree. The tree was struck by lightning in 1917, but according to Mr. Ray's letter dated December 24, 1918 it seems to have borne abnormal fruits even before it was injured.

The number of freaky nuts varies as to season; in some years there are more than in others.

Similar freaky fruits of Black Walnut have been reported before. In 1887 A. A. Crozier of the Department of Agriculture, Washington, describes<sup>1</sup> an abnormal Walnut received from J. R. Johns, Millersburg, Pennsylvania, who thinks that the appearance is due to pollen of the Hickory of which the nearest tree is about 800 yards distant. The nut is described as having "nearly the size of an average Walnut with its lower third seated in an adherent two-lobed cup-like body, in texture much like the outside of a Walnut. The upper part is thinner and smoother than usual and still shows the four parts of the adherent calyx as when young, thus causing it to resemble a Hickory nut, on cutting it open the shell and kernel were found to be those of the Walnut." According to J. R. Johns the lower or Walnut part was more fully developed in some specimens than in the one sent.

<sup>1</sup> In Bot. Gaz. XII, 167 (1887).





Rehder, Alfred and Wilson, Ernest Henry. 1928. "Enumeration of the Ligneous Plants Collected by J.F. Rock on the Arnold Arboretum Expedition to Northwestern China and Northeastern Tibet." *Journal of the Arnold Arboretum* 9(1), 4-27. <https://doi.org/10.5962/p.333847>.

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