A rare view of Wa Shan almost minus its shroud of mist, viewed from the *Abies fabri* forested slopes of Emei Shan. At its far left the mist-filled Dadu River gorge drops to 500-600m. To its right the 3048m high peak of Mao Kou Shan climbed by Ernest Wilson on 3 July 1903. "As seen from the top of Mount Omei, it resembles a huge Noah's Ark, broadside on, perched high up amongst the clouds" (Wilson 1913, describing Wa Shan floating in the proverbial 'sea of clouds').

Wa Shan – Emei Shan, a further comparison

CHRIS CALLAGHAN of the Australian Bicentennial Arboretum updates his woody plants comparison of Wa Shan and its sister mountain, World Heritage-listed Emei Shan, finding Wa Shan to be deserving of recognition as one of the planet's top hotspots for biological diversity.

The founding fathers of modern day botany in China all trained at western institutions in Europe and America during the early decades of last century.

In particular, a number of these eminent Chinese botanists, Qian Songshu (Prof. S. S. Chien), Hu Xiansu (Dr H. H. Hu of *Metasequoia* fame), Chen Huanyong (Prof. W. Y. Chun, lead author of *Cathaya argyrophylla*), Zhong Xinxuan (Prof. H. H. Chung) and Prof. Yung Chen, undertook their training at various institutions at Harvard University between 1916 and 1926 before returning home to establish the initial Chinese botanical research institutions, initiate botanical exploration and create the earliest botanical gardens of China (Li 1944). It is not too much to expect that at least some of them would have had personal encounters with Ernest 'Chinese' Wilson who was stationed at the Arnold Arboretum of Harvard between 1910 and 1930 for the final 20 years of his life.

These Chinese botanists chose to study at the Arnold Arboretum, which had the world's largest collection of Chinese trees, many collected as seeds in their homeland by Wilson, because, to quote Chen Huanyong in an interview with the *Boston Globe*, "it would take me a lifetime of travel (in China) to study what I can find out here about Chinese trees in a few years." (Haas 1988).

While there, these pioneers would have availed themselves of the excellent library facilities of the various Harvard institutions. There they would have sought out, amongst other botanical literature, any publications concerning the great western plant hunters of China. Reading Wilson's praise of Wa Shan (Wilson 1913), where he said he had climbed many mountains in China, including some much higher, but none (including numerous explorations of Emei Shan) had he found richer in cool- temperate plants, they would naturally have wanted to see for themselves this veritable treasure-laden ark of the Chinese flora and fauna.

It was this realisation that made me wonder why there appeared to be no Chinese collections made on Wa Shan since Wilson last collected there in 1908, while numerous Chinese expeditions are recorded to its famous sister mountain of Emei Shan only 35km to the north-east.

This I found not to be the case. In 1928, at the request of Prof. S. S. Chien, director of the botanical division of the biological laboratories of the Science Society of China, established in 1922 at the 1928 proclaimed Chinese capital Nanking (Nanjing), a comprehensive botanical exploration of Szechuan (Sichuan) province in China's southwest was undertaken by Wen-pei Fang. This was the largest survey of the western Chinese flora conducted by Chinese botanists up to that time (Li 1944). Fang was to become perhaps the foremost authority on the flora of Sichuan and especially of Emei Shan.

The primary purpose of Fang's expedition, partly financed by the Arnold Arboretum, was the collection of vascular (higher) plants. However R. C. Ching of the Metropolitan Museum of Natural History, a department of Academia Sinica, the national research institute at Nanking, asked Fang to collect any interesting fungi he came across during his expedition.

From April until November of that year, Fang & his collectors traversed large tracts of Sichuan, amassing a total of around 4000 specimen numbers, duplicates of which were forwarded to the taxonomist Alfred Rehder at the Arnold Arboretum for retention at various Harvard herbaria in exchange for their determination.

During August alone, *ca*. 1500 numbers of herbarium specimens were secured, Series A with *ca*.1100 numbers, 2301 - 3403 from the south-west of the province and Series B with numbers 4001- *ca.* 4400 from the northern region in the vicinity of Songpan and in Pingwu county (Meltcalf *ca*.1928).

The northern part of the expedition was personally undertaken by Fang with his botanical colleague and friend H. F. (S.F.) Chang who later drowned while swimming in a Sichuan river. Simultaneously between 1 and 27 August, a much more comprehensive collection was gathered in the south-west by hired collector(s) and was attributed by Fang to Mt Omei (today's Mt Emei or Emei Shan).

My research has revealed that this collection of about 1100 numbers was in fact collected on Wa-shan's precipitous mountainsides and on its summit.

A number of facts have led me to this conclusion:

1. Studying the plant collection list courtesy of Harvard University Herbarium, it is evident that the collection commenced at 500m near the base of an unnamed mountain on the 1 August 1928 and then increased in altitudinal levels as the days progressed, reaching a maximum altitude of about 3353m during mid-month and then progressively decreasing in altitude until the 27 August, after which the collectors departed the mountain (refer to table).

   The maximum altitude reached is much closer to today's known height of 3236m for Wa Shan than for Emei Shan's 3099m. The dates and elevations, which are not included on the list for these 1100 plant numbers, were gleaned while searching for the identities of Wilson's Veitch collections (unable to be provided by Kew where they were donated by James Veitch), and other Wa Shan collections, in hundreds of botanical journals too numerous to include in the bibliography concluding this paper. (Note: some of the plants for 1 August were the final collections made by Fang in Kuan hsien before moving on to Songpan where his collection there with Chang commenced on 5 August).
2. This plant collection list, in conjunction with my journal search, established that while Fang & Chang were collecting in the Songpan region throughout August (Fang 1939a/b, et al), the hired collector(s) were scouring the slopes of a single mountain, and this agrees with the statement of Franklin P. Metcalf, Professor of Botany, Fukien Christian University, in a memo to Alfred Rehder when forwarding Fang's collections to him for determination. Metcalf mentions collections "at different places at the same time, one probably Fang and associates, the other some collector hired by Fang". The only disagreement here is that the numbers in question are attributed to Songpan and Omei Shan as advised to Metcalf by Fang, with no mention of Wa Shan.
3. Various plants on Fang's list in the range 2301 to 3403 for 1-27 August 1928 are not listed as occurring on Mt Emei as revealed by consulting Li & Shi (2007). Some examples are *Cornus kousa* var. *chinensis, Ilex pernyi,* (both collected by Wilson on Wa Shan), *Celastrus rosthornianus* var. *loeseneri, Ficus subincisa* and *Lithocarpus henryi.* Interestingly, a juniper collected by Fang's collector(s) above 3048m under Fang 2968, was identified by Alfred Rehder as *Juniperus squamata wilsonii*, a taxon named by him only eight years before in 1920. Now renamed *Juniperus pingii* var. *wilsonii*, this conifer is also not known to occur on Mt Emei.
4. Forty (40) plants within the Series A numerical range for August are listed under Fang's numbers as the sole collections for Mount Emei (Li & Shi, 2007), with no further collections of these taxa being listed for any other collectors on this mountain in the subsequent 80 years. This is further evidence that

these plants were not collected in 1928 on Mount Emei. Examples include *Clerodendrum japonicum (C. squamatum)*, *Cotoneaster dielsianus* var. *elegans*, *Lindera glauca*, *Sophora wilsonii* and *Spiraea myrtilloides*.

5. At least 60 plants (10% of listed determinations, excluding ferns/fungi/undetermined taxa comprising *ca.* 44% of Fang's 1928 numerical range for Omei Shan), while occurring on Emei Shan, do not occur there at the elevations given by Fang for these plants, with many of these having discrepancies in their elevations amounting to literally hundreds of metres. These elevations cannot be due to faulty altimeter readings as they are both above and below the elevation ranges listed for Emei Shan, while others fall within a plant's known range. Some examples of these discrepancies are set out in the following table.

W. P. FANG'S NUMBER AND NAME OF TAXON	FANG'S ELEVATION & DATE (in August 1928)		MT EMEI ELEVATION (from Li & Shi, 2007)
2306 ***Daphniphyllum paxianum***	457-610m 1500-2000 FEET*	1	700-1120m
2387 ***Euptelea pleiosperma***	457-610m 1500-2000 FEET*	2	700-1900m
2410 ***Clerodendrum trichotomum*** (*C. trichotomum* var. *fargesii*)	914-1067m 3000-3500 FEET*	2	1133-1600m
2566 ***Ficus tsiangii***	1219-1372m 4000-4500 FEET*	5	680-1200m
2612 ***Lithocarpus cleistocarpus***	1372-1524m 4500-5000 FEET	6	1700-2500m
2615 ***Meliosma yunnanensis*** (*M. fischeriana*)	1372-1524m 4500-5000 FEET*	6	2000-2500m
2683 ***Kadsura polysperma***	1676-1829m 5500-6000 FEET	9	*ca.* 1120m
2797 ***Rosa glomerata***	1981-2134m 6500-7000 FEET	11	*ca.* 2300m
2822 ***Epilobium angustifolium***	2286-2438m 7500-8000 FEET	12	*ca.* 3000m
2856 ***Enkianthus chinensis***	2591-2743m 8500-9000 FEET*	12	*ca.* 2100m
3002 ***Arundinaria faberi*** (*A. fangiana*)	3048-3353m 10,000-11,000 FEET*	15	2500-2640m
3011 ***Pterocarya macroptera* var. *insignis*** (*P. insignis*) [1]	3048-3353m 10,000-11,000 FEET*	16	1700-2100m
3098 ***Ilex dunniana*** ***(Ilex latifolia* var. *fangii)***	1524-1676m 5000-5500 FEET	17	1700-2100m

W. P. FANG'S NUMBER AND NAME OF TAXON	FANG'S ELEVATION & DATE (in August 1928)		MT EMEI ELEVATION (from Li & Shi, 2007)
3139 *Euonymus acanthocarpus*	1372-1524m 4500-5000 FEET	18	1700-1750m
3194 *Tilia tuan*	1372-1524m 4500-5000 FEET	19	700-1300m
3220 *Rosa roxburghii*	1372-1524m 4500-5000 FEET*	20	*ca*. 550m
3305 *Lonicera ligustrina* (*L. pileata*)	762-914m 2500-3000 FEET	22	*ca*. 750m
3331 *Lyonia ovalifolia* var. *lanceolata*	762-914m 2500-3000 FEET*	23	*ca*. 2400m
3392 *Eleutherococcus trifoliatus*	457-610m 1500-2000 FEET	27	600-1000m

*from HUH database

Note:
Plants were collected within the above elevation ranges, which represent conversions from the original convenient 500 or 1000-foot collection zones. Hence 3048-3353m converted from 10,000-11,000 feet. The median reading for this is 3200m, close to today's known height of 3236m for Wa Shan.

6. What provides conclusive evidence for Wa Shan and not Mt Emei being the source of these plants, is the determinations of the fungi Fang was asked to collect as a sideline to his primary purpose of collecting vascular plants. Fang & Chang duly collected fungi around Songpan during their time together in this locality, while at least 14 numbers of fungi, collected by Fang's hired collector(s) at intervals during the same time, are listed for Wah-shan or Wah-mei-shan (Teng 1932a & b). These can only be alternate names for the same mountain, as no two collections could have been undertaken simultaneously by his collector(s) on different mountains with the collection elevations on two mountains coinciding over a period of 27 days! Also some identical numbers are listed for Wah-shan in one journal and for Wah-mei-shan in a different journal. This single mountain would therefore be Wilson's Wa-shan.

Note 1:
Throughout many of the journals sighted by me, Fang uses alternate spellings for transliterations of the same locations. eg. Shaw-p'ing-shan = Sha-p'ing-shan. Hence Wah-shan on Fang's herbarium sheets equals Wa-shan. (These are not typographical errors as many examples occur in issues of different journals).

Note 2:
The highest mountains between Emei Shan and Wa Shan are both *ca*. 2900m; hence there is no mountain in this region above 3200m elevation for which the composite name Wah-mei-shan could refer.

[1] *Pterocarya macroptera* var. *insignis*, collected near the summit only occurs in China to 2700 metres and Fang's collection is probably var. *delavayi*, not named until 1975. This variety occurs to 3300 metres (Flora of China), but is not listed for Mount Emei (Li & Shi, 2007).

The question arises why Fang would attribute collections made on Wa Shan in 1928 to Omei Shan?

The answer to this may be found in Fang's paper "*The Rhododendrons of Mount Omei*" (Fang 1946), in which he states that he considers the areas to the south and southwest of Omei Shan, as far as the Dadu (Tung) River and beyond, to be part of the "Plateau of Omei Shan". Therefore Fang includes under Omei Shan some collections of rhododendrons made in Opien Hsien (Ebian County), a county that then included Wa Shan but no longer adjoins Emei County to its southwest. The only two copies of this rare 1946 final volume of the *Journal of the West China Border Research Society* that I have located are in an extremely fragile condition, their tissue-thin pages beginning to disintegrate.

There is evidence that Fang's collections listed for Omei Shan in various journals for July 1930, may also be from Wa Shan. For the 1930 collections, there are numerous discrepancies in the elevations given for plants, numerous substantial discrepancies for elevations of named localities on Omei Shan, and yet again there are listed collections of fungi for Wah-shan, not Omei Shan. Unfortunately, as at the deadline for this article, I have been unable to obtain a complete copy of Fang's 1930 Plant Lists for examination.

If these collections by Fang in August 1928 and July 1930 had in fact been for Omei Shan as stated by Fang, then since the main purpose of these expeditions was the collection of higher plants, with fungi as a sideline, there would need to be records of vascular plants for "Wah-shan" and records of fungi for Omei Shan collected by Fang or his collectors for these periods, yet none have been found.

A few interesting plants found on Wa Shan by Fang's collector(s) in 1928, having been missed by Wilson and his collectors 20 years earlier, include *Davidia involucrata* var. *vilmoriniana* (Wilson had collected the typical variety at Wa Shan in July 1903 & Sept. 1908), *Camellia elongata* and *C. szechuanensis*, both reported as endemic to Emei Shan (Li & Shi 2007), *Camellia pitardii, Castanea henryi*, *Castanopsis sclerophylla* (not recorded for western Sichuan in Flora of China), *Carpinus fangiana*, syn. *C. wilsoniana* (possibly the unidentified hornbeam found by Wilson during his first climb of Wa Shan in July 1903), *Cephalotaxus oliveri*, *Tilia tuan* and *Rehderodendron macrocarpum*, the type-species of this new genus established in the Styracaceae in 1932. This last plant is erroneously recorded in botanical literature as having been discovered on Mount Emei in August 1928, and in fact is not endemic to that mountain as stated in Bean (1976).

Mist shrouded Wa Shan, known today as Ta Wa Shan (Big Tiled Mountain, 3236m) and Xiao Wa Shan (Little Tiled Mountain, 3064m), plus adjoining spur peaks of close to and over 3000m, in Ebian county in Fang's time and now in Jinkouhe county, are adjacent on their southern and western flanks to one of China's deepest gorges on the Dadu River. They should not be confused with Wa-wu Shan (Tiled House Mountain), a lesser mountain of 2800m located

to the west n. w. of Mount Emei in Hongya County and often erroneously abbreviated as Wa Shan. Only Mount Emei and Wa-wu Shan are currently open to foreign travellers.

Further botanical collections by Chinese collectors have been made on Wa Shan in the years up until at least 1939, including those by C. W. Yao (1938) S. H. Ou (pre-1934) and C. L. Sun (1939), with records of their Wa Shan collections scattered in various western and Chinese herbaria and scientific institutions. Other possible collections for Wa Shan during this period are by T. S. (T. H.) Chao (1938 & 1939), W.C. Cheng (1930) S. N. Hsu (year unknown), Y. S. Liu (1937 & 1938), C. F. (T. Y.) Lu (1929), L. Y. Tai (year unknown), Tu, Ching & Shun (1929), and T.T. Yu (1932), all of whom collected in Ebian county in the years indicated. At least some of these must have collected on Wa Shan, however as most of their collections are held in Chinese herbaria, it has been difficult to obtain the required information.

It should be mentioned that there are plants on Emei Shan who's nearest known occurrence is the eastern coastal provinces of China. This indicates to me that plants not then native to Emei Shan were probably introduced by some of the literally tens of thousands of Buddhist monks who lived and died on this mountain in the past 1700 or more years that it has been a Buddhist sanctuary and which at one time had in excess of 100 Buddhist temples scattered over its summits and slopes (not to mention possible plant introductions by the innumerable pilgrims during this one and two-thirds millennial period). Some of these will have become naturalised.

For this paper I have updated the appendices (Callaghan & Png, 2010) listing those woody plants presently known to occur on Wa Shan in 37 surveyed genera (Appendix One) and comparing the numbers in these genera on Wa Shan and Emei Shan (Appendix Two). As in the 2010 article I have restricted this survey to elevations above 1800m where Ernest Wilson concentrated his search for cool-temperate plants suitable for cultivation in Britain (Wilson 1913). While it has been found since then that the Wa Shan range drops to around 500-600m at the Dadu River on its southern and western flanks, a meaningful comparison of the flora covering the total heights of both mountains is still not possible, with full details unavailable for Wilson's Wa Shan collections held at Kew, his herbaceous collections held at Harvard and the Chinese collections held there and scattered elsewhere.

It should be emphasised that while the full extent of both Wilson's and especially the Chinese collections on Wa Shan up to 1939 are still unknown, in the surveyed woody genera they presently amount, above 1800m, to 110% of the taxa of Emei Shan, a mountain that has benefited from an extra 70 years of concentrated botanical exploration and research. Wilson's Wa Shan collections on their own presently total 98% of all taxa in these genera that have been made on Emei Shan, above 1800m, since Ernst Faber first collected

there in 1887! This richness in species is not confined to woody plants. In herbs for example, more species of alpine primulas were found on Wa Shan by Wilson in a few years than has been found by all the many collectors on Emei Shan during 120 years of exploration.

Also, Wilson's complicated handwriting has resulted in many researchers attributing numerous of his Wa Shan collections to Wu Shan, a mountain range straddling the Hupeh/Sichuan border 700km to the north-east, and even to a Wa Shan rhododendron collected by Wilson being named *R. wuense* after Wu Shan, where it was mistakenly thought to have been collected. Plus there are still many of Wilson's 1903-1904 Veitch collections listed with unknown localities in western Sichuan likely to have come from Wa Shan.

I feel certain that once Wilson's and the Chinese collections made there are more fully known, that Wa Shan will undoubtedly equal or probably eclipse Emei Shan as one of the botanically richest localities on the planet for temperate flora. This, together with its wealth of recorded rare animal and bird wildlife, including the iconic giant panda if it hasn't now become extinct on the mountain, makes Wa Shan an unrecognised biologically diverse hotspot of international significance.

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Appendix 1 : A survey of woody plants collected on Wa Shan 1889-1939

Key to Specimen Numbers

P = A. E. Pratt 1889 **H** = A. Henry 1889 **V** = E. H. Wilson 1903-1904 **A** = E. H. Wilson 1908
F = W. P. Fang 1928 **Y** = C. W. Yao 1938 **S** = C. L. Sun 1939 * = E. H. Wilson seed number

ORIGINAL DETERMINATIONS APPEAR IN BRACKETS. ALL TAXA OCCUR ABOVE 1800 METRES.

PLANT NAME & SPECIMEN NUMBER	PLANT NAME & SPECIMEN NUMBER
Abies *fabri* (*A. delavayi*) V1515* V3021 V3022 A2089 F2970	*Acer caudatum* (var. *multiserratum*) V3347 A1161 (*var. prattii*) H8802 type F2812
Abies sp./var.? (not collected – mature trees felled)	*Acer davidii* F2692
Acer *amplum* subsp. *catalpifolium* (*A. catalpifolium*) V3350	*Acer erianthum* H8989 type V3347-A F2659 F2661 F2796
Acer cappadocicum subsp. *sinicum* V3352 V3357	*Acer flabellatum* V1455* (this sp.?) CP2009

PLANT NAME & SPECIMEN NUMBER
• *Acer fulvescens* A1162
Acer laevigatum V3346
Acer laxiflorum A1154 F2874
Acer oliverianum V3352-A V3353-A
Acer pictum subsp. *mono* (?) (*Acer* sp. aff. *truncatum*) V3357-A(?)
Acer sinense V3345
Acer stachyophyllum H8799 (*A. tetramerum* var. *elobulatum*) A1895 F2656 F2751
Acer stachyophyllum subsp. *betulifolium* (*A. tetramerum*) V3351
Acer sterculiaceum subsp. *franchetii* V1504*
Actinidia *callosa* var. *henryi* A2016
Actinidia kolomikta H8806 A854-A F2801 F2865
• *Actinidia polygama* A934 A2010
Actinidia venosa A888(p.p.) A891(p.p.) A1029(p.p.)
Berberis *aemulans* A930 type F2977
• *Berberis aggregata* V1840*
• *Berberis feddeana (B. dielsiana)* A2863
• *Berberis gagnepainii* V3148 type A1344 (var. *filipes*) V3148-A (var. *lanceifolia*) V3148-B
Berberis gagnepainii var. *omeiensis* F2916 type
• *Berberis sanguinea* H5763
Berberis silva-taroucana A955 A2858
• *Berberis sublevis* (*B. wallichiana*) Vxxxx

PLANT NAME & SPECIMEN NUMBER
Berberis verruculosa (*B. aff. wallichiana*) V3150
Berberis wilsoniae A1356(p.p.)
Betula *luminifera* A816 A3368
Betula potaninii V4490 A1140
Betula utilis (var. *prattii*) V4492a V4530 A1138
Camellia *pitardii* F2718 F2719
Celastrus *glaucophyllus* A952-A
• *Celastrus hookeri* A1184 ①
• *Celastrus rosthornianus* var. *loeseneri* F3089 ②
• *Celastrus rugosus* A1106
• *Celastrus vaniotii* (*spiciformis* var. *laevis*) A1176
Clematis *grandidentata* (*C. grata* var. *grandidentata*) A1100 F2794
Clematis lasiandra V3119
Clematis montana var. *wilsonii* V1900* V3114-A(?) A1303 F2838 (*f. platysepala*) V1796* A2461
Clematis pogonandra (*C. faberi*) V3125 (*C. prattii*) V3126(?)
• *Clematis pseudopogonandra* V3123
• *Clematis rehderiana* (*C. veitchiana*) V1422* (p.p.)
• *Clematis ranunculoides* (*C. heracleifolia* var.?) Vxxxx
Clematis repens H8803 F2790
• *Clematis tangutica* var. *obtusiuscula* V1794*(?)
Cornus *chinensis* A825 (p.p.)

PLANT NAME & SPECIMEN NUMBER
Cornus hemsleyi A1845 F2821
• *Cornus kousa* subsp. *chinensis* F2655 F3023 (*C. kousa*) A223-B
Cornus macrophylla Vxxxx
Cotoneaster *adpressus* (*C. sp. aff. horizontalis*) V3512(?)
• *Cotoneaster ambiguus* V1507*
• *Cotoneaster brevirameus* V3513 type
• *Cotoneaster bullatus* var. *macrophyllus* A873 type
Cotoneaster dielsianus var. *elegans* A2170
Cotoneaster divaricatus F2980
Cotoneaster glabratus V1511* A2185 type F2750
Cotoneaster horizontalis S998
Cotoneaster moupinensis V3516 A857(p.p.) F2811 S1130
• *Cotoneaster washanensis* (*C. moupinensis*) A857-B type
• ***Deutzia*** *discolor* V1799*
Deutzia discolor var. *veitchii* V1434* ③
Deutzia longifolia V3567 V3567-A A1340
• *Deutzia rubens* V3566
• ***Dipelta*** *floribunda* V1451*
• *Dipelta ventricosa* V3723 A2951
Enkianthus *chinensis* V1529* (p.p.) F2856
Enkianthus deflexus V1529* (p.p.) V3912 A1155 F2878

PLANT NAME & SPECIMEN NUMBER
• *Enkianthus pauciflorus* V3913 type
• ***Euonymus*** *aquifolium* A1366 type [Endemic] [*syn.:Glyptopetalum aquifolium*]
• *Euonymus bockii* (*E. subsessilis* var. *latifolius*) A1216
Euonymus cornutus V3333 F2909
Euonymus echinatus (*E. subsessilis*) A1215
Euonymus frigidus (*E. porphyreus*) H8795 A968(p.p.)
Euonymus giraldii (var. *angustialatus*) V3334
Euonymus hamiltonianus (*lanceifolius*) A1105-A
Euonymus myrianthus (*E. sargentianus*) A1187
Euonymus sanguineus V1502*(?) F2798 (var. *camptoneurus*) A968(p.p.)
• ***Fraxinus*** *platypoda* (*F. paxiana*) A2780
Hydrangea *anomala* V4901(?) A491 (p.p.)
Hydrangea aspera (var. *velutina*) A2403 A2405 (*H. villosa*) Vxxxx
• *Hydrangea chinensis* (*H. scandens* subsp. *chinensis*) A1159 (p.p.) ①
Hydrangea davidii A1159 (p.p.)
Hydrangea heteromalla (*H. arborescens*) Vxxxx
Hydrangea longipes A2413
• *Hydrangea paniculata* Vxxxx
Hydrangea robusta (*H. rosthornii*) A1156 A1348 A1372 A2414
Hydrangea strigosa (*H. aspera* var. *macrophylla*) V1803* V4902
Hydrangea xanthoneura V4900 A1354 A2409 F2800 F3000 (*H. pubinervis*) A2411

PLANT NAME & SPECIMEN NUMBER
Ilex fragilis A892 (f. *kingii*) V3341
• *Ilex pernyi* V3342
Ilex yunnanensis S1133
• ***Lindera glauca*** F2863 F2915
Lindera prattii V4428
Lindera pulcherrima var. *hemsleyana* (*L. strychnifolia* var. *hemsleyana*) V4429
Lonicera acuminata (*L. alseuosmoides*) A938 (*L. fuchsioides*) Hemsl. not hort. F2681
Lonicera crassifolia H8927 type
Lonicera hispida (*L. chaetocarpa*) V3754 A942
Lonicera nigra (*L. lanceolata*) A927 F2806 F2978
• *Lonicera subaequalis* H8936 A940
Lonicera tangutica A950
• *Lonicera trichosantha* var. *deflexicalyx* (*L. deflexicalyx*) A808-A
Lonicera webbiana (*L. mupinensis*) V3741 A861
Magnolia sargentiana A923 [Endangered]
• *Magnolia sargentiana* var. *robusta* A923-A type [Endemic?/Endangered] ④
Magnolia wilsonii (*M. nicholsoniana*) A838 [En]
Malus hupehensis (*M. theifera*) A1129 ①
Malus prattii A1107 F2875
• *Malus rockii* V3499
• ***Pinus densata*** (*P. sinensis, P. wilsonii*) A1471 A1477

PLANT NAME & SPECIMEN NUMBER
• ***Prunus micromeloides*** A824 type ③
Prunus obtusata V3521 A2844 [= *Padus obtusata*]
Prunus oxyodonta V3525 (*P. podadenia*) V3525-A [= *Cerasus trichostoma*]
Prunus salicina (*P. triflora*) A1121
Prunus wilsonii (var. *leiobotrys*) F2689 F2756, (*P. sericea* var. *batalinii*) A222-B [= *Padus wilsonii*]
Quercus engleriana A3632
Quercus serrata A1332
Rhododendron ambiguum V3943 F2975 F2982
Rhododendron argyrophyllum V1521* V3962 A1210
• *Rhododendron augustinii* subsp. *chasmanthum* V1524* (p.p.) V3950 (p.p.)
Rhododendron calophytum V1523* V3979 A1224, A1367 (p.p) F2871
Rhododendron concinnum A3446 A3448 F2972 (*R. yanthinum*) H8874 V1433* V1524* (p.p.) V3942
Rhododendron davidii V1531*(p.p.) V3978(?)
Rhododendron dendrocharis [epiphytic on *Abies, Tsuga, etc.*] H8857 V3938(?)
Rhododendron faberi A3436 F2973 F2976 S1042 (*R. wuense* - named in error) V3960
• *Rhododendron hypoglaucum* V1885* ②
• *Rhododendron insigne* H8859 P349 V1527* V3965 type A1339 [Endemic?]
Rhododendron longesquamatum V1520* V3973 (p.p.) A1361 A3439 S1043
Rhododendron lutescens H8862 V1875* A1345
Rhododendron nitidulum Y3048 S1180 (var. *nubigenum*) V3935-A(?)
• *Rhododendron ochraceum* Vxxxx A3425 type ②

PLANT NAME & SPECIMEN NUMBER
Rhododendron orbiculare H8873 V1519* S1090
Rhododendron oreodoxa V1531*(p.p.) S1040
Rhododendron pachytrichum V1525* V3976 A1203 A1349 F2752
Rhododendron polylepis V1857* V3941 V3949, A1221 (*R. chengshienianum*) F2983
Rhododendron ririei F2752
• *Rhododendron sargentianum* V3933
• *Rhododendron searsiae* A1343 type A3449
Rhododendron stamineum A3470
Rhododendron strigillosum H8872 P311 V1435* V3974 A1341 A3429 A3430 F2971 Y3053
Rhododendron strigillosum var. *monosematum* (*R. monosematum*) V1522* V3976-A
• *Rhododendron trichanthum* (*R. villosum*) V1862* V3945 A1342
Rhododendron williamsianum A1350 type
Rhododendron wiltonii V1871* V3952 type A1353 (p.p.)
Ribes *laurifolium* V3576? (not *R. meyeri*) A817
Ribes longeracemosum V3575
• *Ribes longeracemosum* var. *davidii* V1405* Vxxxx A1798
• *Ribes maximowiczii* A958 ①
• *Ribes maximowiczii* var. *floribundum* V1668 V3579 ③
• *Ribes moupinense* var. *laxiflorum* A822 ③
Ribes tenue A823 (*R. coeleste*) V3569
• ***Rosa*** *brunonii* A1125

PLANT NAME & SPECIMEN NUMBER
Rosa davidii H8944 V1440* V1829*(?) V3545 A3585 F2780
Rosa davidii var. *elongata* V3545-A(?) A1099 A1114 A1178
• *Rosa giraldii* var. *venulosa* V3533
Rosa glomerata A1334-A F2797
• *Rosa longicuspis* A1098-A
Rosa moyesii f. *rosea* V3544 A1104
• *Rosa murielae* V3535-A
Rosa omeiensis H8947 H8961 V1454* V3546 A959-B A3596 F2818
Rosa prattii A1150
Rubus *amabilis* V3469(?) (*R. pileatus*) V1403*
Rubus assamensis (*R. sepalanthus*) A935
• *Rubus biflorus* (var. *quinqueflorus*) V3488
Rubus fockeanus V3473
• *Rubus fragarioides* (var. *adenophorus*?) V3472
Rubus henryi var. *sozostylus* V3489(?)
Rubus inopertus A946
• *Rubus lutescens* Vxxxx
• *Rubus lasiostylus* A858-A (*R. triphyllus*) V3477
Rubus pentagonus var. *modestus* V3474
Rubus pileatus F2858 F2862
Rubus rosifolius Vxxxx

PLANT NAME & SPECIMEN NUMBER
Rubus setchuenensis F2651
Rubus subornatus var. *melanadenus* (*R. vicarious*) A948
• *Rubus tricolor* V3471 A828
***Salix** cathayana* A1405 A1405-A A2130
Salix dissa (?) V4514
• *Salix ernestii* A2159
Salix heterochroma H5671
Salix hylonoma A2138 type A2138-A (*S. isochroma*) V4524 (*S. chuniana*) S1073
• *Salix microphyta* V4513 A2141
Salix moupinensis H8891 V4522 A2126
• *Salix rehderiana* A1424 A2125 [this number may be a closely related taxon – C. Schneider]
Salix wallichiana A2148
***Sambucus** adnata* V5033-A(?) Y3084
• *Sambucus javanica* F2654 (*S. hookeri*) Y3088
• *Sambucus williamsii* (*S. racemosa*) Vxxxx
• *Sambucus wightiana* F2643 F2837 F2848 F2883 F3003 ③
***Sorbus** aronioides* V1448*(?) A2993 type
Sorbus helenae (*Pyrus* sp.) V3718 type
Sorbus hemsleyi (*S. xanthoneura*) F2722
Sorbus henryi H8957 type
• *Sorbus microphylla* (*Pyrus microphylla*) V3504 ①

PLANT NAME & SPECIMEN NUMBER
Sorbus multijuga? (*Pyrus* sp.) V3501
Sorbus prattii (var. *tatsienensis*) F2792
Sorbus prattii var. *aestivalis* (*S. aestivalis*) A3002
Sorbus sargentiana F2877
Sorbus scalaris V1509* A922 type (*S. pluripinnata*) H8960
Sorbus setschwanensis H8975 V3502 A864-B
• ***Spiraea** canescens* V3557-A(p.p.)
Spiraea henryi A1172
Spiraea japonica var. *acuminata* A579(p.p.)
Spiraea japonica var. *ovalifolia* V3555 A2746
Spiraea mollifolia V3554
• *Spiraea myrtilloides* A2761 F2974
Spiraea rosthornii A965 A2759
• *Spiraea schneideriana* V3557 type
Spiraea schneideriana var. *amphidoxa* V3557-A type F2950
***Styrax** hemsleyanus* A2578
• *Styrax grandiflorus* (*S. hookeri*) V4065 (p.p.) ①
• *Styrax perkinsiae* V4065-A(?) A2576 type
Styrax roseus V4065 (p.p.) type F2787 F2873
***Syringa** komarowii* (var. *sargentiana*) V4081 (*S. sargentiana*) A2581
• *Syringa tomentella* F2819

PLANT NAME & SPECIMEN NUMBER
• ***Tilia*** *chinensis* var. *intonsa* A2328
Tilia nobilis V3285 type A2326
• ***Ulmus*** *bergmanniana* var. *lasiophylla* A820 type A1423 ②
• *Ulmus castaneifolia* Vxxxx
Viburnum *betulifolium* (*V. dasyanthum*) A1805
Viburnum cylindricum P732(?) F2732
Viburnum davidii V1819* V3728 A963

PLANT NAME & SPECIMEN NUMBER
Viburnum erubescens V3734 (var. *prattii*) A1825
Viburnum nervosum (*V. cordifolium*) V1443*(?) V3735 A918 F2864
Viburnum oliganthum F3013
• *Viburnum opulus* subsp. *calvescens* (*V. opulus*) Vxxxx
• *Viburnum propinquum* V3727
Viburnum ternatum V3736-A(?)

ORIGINAL DETERMINATIONS APPEAR IN BRACKETS. ALL TAXA OCCUR ABOVE 1800 METRES.

LEGEND

Vxxxx	Indicates undetermined Wilson specimen number for 2nd Veitch Expedition
*	An asterisk indicates Wilson seed number for 2nd Veitch Expedition
•	81 taxa (*ca.* one third) not listed for Emei Shan in Li & Shi (2007)
①	6 taxa not listed for Sichuan in Flora of China (three occur in adjacent Yunnan)
②	4 taxa not listed for southwestern Sichuan in Flora of China
③	5 taxa not listed in Flora of China
④	1 taxon not accepted in Flora of China (see however, Callaghan & Png 2010)

Note: Despite a number of requests to the herbarium where they are held, I have been unable to obtain details of the determinations of many plants in the above genera known to have been collected by Wilson on Wa Shan in 1903 and 1904, even when specimen numbers have been provided. Therefore I have been unable to include these taxa for Wa Shan in the above and following appendix. For example, Wilson made at least 6 collections of *Lonicera* on Wa Shan in July 1903 during the 2nd Veitch Expedition, yet only 2 of these could be found and listed above. The missing taxa collected at Wa Shan would have undoubtedly increased many of the generic totals in the following appendix had the determinations been available.

Additional Wa Shan collections not listed in Appendix 1:
•*Actinidia kolomikta* H8994. Cerasus sp. V3520 (not a taxa listed in Appendix). *Euonymus giraldii* var. *ciliata* V3328(?). *Rhododendron argyrophyllum* subsp. *omeiensis* (var. *omeiensis*) V3962-A type. *Rhododendron longipes* V1526*, V3966. *Rhododendron lutescens* V3939. •*Rhododendron nivale* subsp. *boreale* (*R. nigropunctatum*) H8897, V1543 (p.p.?). *Rhododendron watsonii* V3964 type. •Ribes henryi H8941. *Rosa moyesii* [Pratt s.n.]. *Rubus ichangensis* V1795*. *Rubus malifolius* V1404*, V3480. *Rubus xanthocarpus* [Pratt s.n.]. *Rubus xanthoneurus* (*R. spinipes*) H8969. •*Sorbus rehderiana* (*Pyrus aucuparia* var.?) V1516* (apparently failed to germinate/survive). •*Spiraea canescens* var. *glaucophylla* (var. *sulphurea*) Vxxxx. •*Viburnum atrocyaneum* f. *harryanum* (*V. harryanum*) V1816*, V3733.

Appendix 2 : Updated comparison chart of surveyed genera on Wa Shan & Emei Shan

TAXA ONLY OCCURRING BELOW 1800M ARE EXCLUDED, AS ARE TAXA WITH UNLISTED ALTITUDES, CULTIVATED PLANTS AND SYNONYMS. EMEI SHAN TAXA FROM LI & SHI (2007).

GENUS	WA SHAN 1889-1939	EMEI SHAN 1887-2007	GENUS	WA SHAN 1889-1939	EMEI SHAN 1887-2007
Abies	2	1	*Magnolia*	3	3
Acer	15	12	*Malus*	3	2
Actinidia	4	4	*Pinus*	1	-
Berberis	10	5	*Prunus*	6[1]	10[1]
Betula	3	5	*Quercus*	2	1
Camellia	1	3	*Rhododendron*	31	23
Celastrus	5	3	*Ribes*	8	8
Clematis	9	9	*Rosa*	11	7
Cornus	4	4	*Rubus*	19	21
Cotoneaster	10	9	*Salix*	9	14
Deutzia	4	1	*Sambucus*	4	2
Dipelta	2	1	*Sorbus*	12	11
Enkianthus	3	2	*Spiraea*	10	8
Euonymus	10	13	*Styrax*	4	3
Fraxinus	1	-	*Syringa*	2	-
Hydrangea	9	7	*Tilia*	2	1
Ilex	3	10	*Ulmus*	2	-
Lindera	3	3	*Viburnum*	10	9
Lonicera	8	7	**TOTAL TAXA:**	245 [110%]	222 [100%]

Note [1] Most *Prunus* above reclassified in genera *Cerasus and Padus.*

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Erratum: It was Mao Kou Shan, the north-western spur of Wa Shan, not Xiao Wa Shan as stated in the 2009 IDS Yearbook article, that Ernest Wilson climbed on 3 July, 1903 – Chris Callaghan

Epilogue

Readers will recall from our previous article (Callaghan & Png 2010), how Euan Cox commented that despite Pratt & Kricheldorff leaving their Chinese collectors behind at Wa Shan for most of the summer in 1889, it was odd that no records exist of any plants collected there.

However, the collectors left behind were under the charge of Augustine Henry's Chinese collector (Henry, who was never in western Szechuan, had relocated at the start of spring from Yichang at the foot of the famous Yangtze gorges to the island of Hainan. Therefore, most of the Wa Shan collections (at least 200-250 numbers), were collected on behalf of Henry and sent to Hong Kong and various European herbaria, most, if not all, without the collection location.

It is an interesting fact that while Henry and virtually no-one else since has known precisely where this collection came from (herbarium labels state 'Szechaun' or 'western Szechuan'), there was one person who did, and that person was Ernest 'Chinese' Wilson! This is why when he arrived at Leshan in June 1903 (see map, Callaghan & Png 2010), the first location he targeted for collecting in Western Szechuan was Wa Shan, ahead of the closer, more easily accessible Omei Shan, which he visited 4 months later.

Aware of the richness of Henry's Western Szechuan collection, Wilson no doubt got its location from Henry's collector while based at Yichang during his first expedition for Veitch. Wilson probably hired this Chinese collector to accompany him to Wa Shan and previously in 1900 to locate in Hupeh the "elusive" Dove tree, *Davidia involucrata* , the plant that first brought him to China!