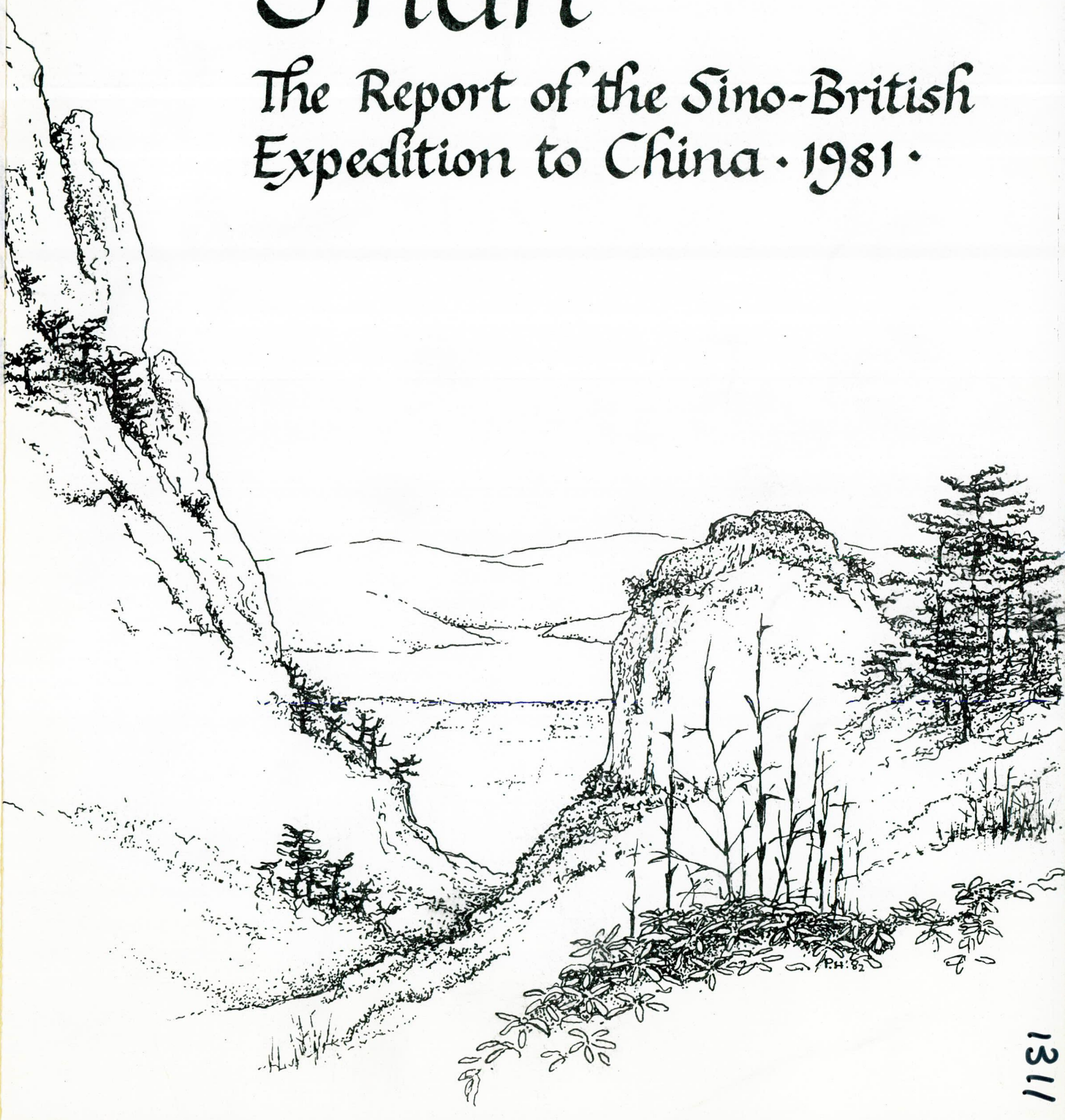
Cang Shan

The Report of the Sino-British Expedition to China · 1981 ·



Cangshan

The Report of the Sino-British Expedition to China, 1981

Compiled by R.J. Mitchell

with D. Chamberlain, P.A. Cox,
P.C. Hutchison, Mrs. J.A. Kinnaird
and R. Lancaster.

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Photographs, unless otherwise stated, by R.J. Mitchell.

Sino-British Botanical Expedition to Cangshan 1981

R.J. Mitchell

Introduction

Western Yunnan, with adjacent Burma and Tibet, is the genetic centre of diversity for many plant genera and has probably the highest concentration of temperate plants in the world. Accounts of this area are few, particularly for western Yunnan; while quite detailed they apply mainly to the period 1870 to 1947, when the western marches were first explored by western travellers. These accounts describe a situation different from that which prevails today for, with the increasing population, severe pressures are placed on the natural vegetation as man invades, resulting in destruction of the finely balanced natural environment.

There is urgency in this matter for large tracts of virgin forest are being removed, more land is being taken into cultivation to feed the increasing population* and the hill tribespeople are firing large tracts of high altitude forest to procure grazing for their animals. These areas are steeply sloping, and with the removal of the natural stabilizing vegetation mass soil erosion results on a horrifying scale destroying the natural ecosystem and therefore the richness of the unique flora.

From specimens in herbaria previously collected in Yunnan it has become clear that there are a number of taxonomically difficult genera in this area of western China. Some of the problems that arise in delimiting the species in such genera can only be solved by field and experimental studies. This is particularly true of the genus Rhododendron as a large number of hybrids occur in cultivation though the extent of natural hybrids in the field is not known. This is also the case for the genus Paris though here the problems arise from the plethora of ill-defined taxa whose status in the wild has not been studied. Furthermore, cytological studies in genera such as Pleione and Paris require precisely localised living material. Thus the value of revisiting

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* over 1,000 million in China now

areas where the species were originally collected may be seen. Only now has the opportunity to gain field experience at first hand become politically possible for western botanists.

Marco Polo was probably the first European to visit Tali (now Dali in the new Chinese pinyin, but named Carajan by him in his diaries) in the year 1253 at the court of Kublai Khan during the great campaign of the Mongols. The original inhabitants of the area - the Bai people - have now re-established themselves, and the region is called the Dali Bai Autonomous Prefecture with its centre of government at Xiaguan at the southern end of Erh Hai Lake. Dali and Yangbi, two of the major towns now have county governments administering local law and order. The picture painted by early travellers is rather different from the reality of today. Marco Polo in Chapter 50 of his 2nd book writes "The country is wild and hard of access, full of great woods and mountains which it is impossible to pass, the air is so impure and unwholesome, and any foreigner attempting it would die for certain".

In most recent times visitors were mainly engineers and geographers looking for trade links and rail routes between Burma and China or between French Indo-China and Yunnan. Colonel Baber in his Parliamentary Report China No. 3 (1879) writes: "From the western margin of the majestic lake, which lies approximately north and south, rises a sloping plain of about three miles average breadth, closed in by a high wall of the Tien-tsang (Cangshan) range. In the midst of the plain stands the city (Dali); the lake at its feet, the snowy summits at its back".

It was on this mountain range that our joint botanical expedition was to spend four weeks studying the plants and recording the vegetation. Five collectors had been there before us and their records were invaluable.

The French Missionary, Pére Jean Marie Delavay botanised in the hills to the north of Dali from 1883. It is estimated that Delavay sent more than 4,000 species to the Museum in Paris, and of those 1,500 were new to science. It is not surprising, therefore, that many of these plants were named in his honour.

From 1904 to 1932 George Forrest and his team of native collectors covered large tracts of country in western Yunnan,

north Burma and southeast Tibet. He explored the Dali area most thoroughly during his third expedition (1912-1914) when Forrest spent some considerable time at Dali. His main interests were Rhododendron, Primula, Gentiana and Lilium although his collections were vast by any standard.

Frank Kingdon-Ward was more of a geographer-explorer than a botanical collector but his plant introductions are of major importance too. He passed through Dali regularly from 1911 to 1922 en route to other collecting areas and his accounts of the area are invaluable.

The Austrian Handel-Mazzetti visited the area during his travels between 1913-1917 but his collections are small. The American Joseph Rock was the last traveller/collector to visit this area in 1947. His last expedition using native collectors took him through Yangbi and Dali Counties on the western and eastern sides of the mountain range. Rhododendrons from this expedition are currently growing in various Botanic Gardens.

Our visit was arranged through the Royal Society and the Academy of Sciences of China. This was the first botanical field expedition to be undertaken by a Sino-British party.

Its success was entirely due to the meticulous planning carried out by our hosts, the Institute of Botany in Kunming and to the faultless organisations of logistics in the field. We understand that western Yunnan was opened to foreigners in 1981, shortly before our expedition arrived and we are particularly grateful that the special permission required to visit the area was granted, both by Peking and by the local officials of Yangbi and Dali.

The Expedition was centred on the Cangshan Range above Dali - a range of some 50 km in length and with seventeen peaks along its jagged ridge, attaining a height of 4122 m. Dali is centred in an area which is unstable geologically and is prone to earthquakes - the severe one of 1925 resulted in considerable damage to property and loss of life.

The Cangshan Range was formed as the result of a granite intrusion through the limestone strata and, at

areas of pressure and heat, the rocks have melted and reformed to give a great variety of differing types including marble in many colours and formations. A set of rock samples showing the range of metamorphosis around this intrusion has now been lodged in the Department of Geology, St. Andrews University. It is the only granite influenced range in this large area; the remainder are predominantly of limestone although limestone crags are present at the high altitudes.

The Cangshan Range is important botanically as it is an isolated massif to the east of the main range of mountains that run through west and northwest Yunnan, and adjacent provinces of northwest Burma and southeast Tibet. Because of this several geographical elements of the flora of south-west China have outlying representatives on the Cangshan. In addition, there are several species that are almost endemic to the mountain.

The aims of the expedition were as follows:

1) to bring back to Britain live material, both as seeds and plants, for further study. Seven hundred plants representing 180 separate collections and 213 packets of seed were collected. In addition, a certain amount of live material was collected for the Kunming Institute of Botany.
2) to make a general collection of herbarium specimens to augment the collections, both in China and in the West. In all, up to eight sets were collected. Sets were lodged in Kunming for distribution to Peking and Xiaguan and at Edinburgh for distribution to Kew, Harvard and St. Andrews University.

Several of the plants brought back have proved to be reintroductions into this country of plants lost to cultivation over the years since China was closed to foreign travellers.

A long term goal was to pave the way for future joint expeditions between our countries.

Special attention was paid to the Ericaceae (Rhododendron in particular), Hypericum (for the British Museum (Natural History)), Primula, Paris, Trillium and Arisaema.

The Chinese botanists, with forestry experts seconded from the Regional Government, also surveyed the vegetation

in order to assess arguments for declaring the area as a National Nature Reserve.

The British team consisted of David Chamberlain of the Royal Botanic Garden, Edinburgh, studying Rhododendron and bryophytes; Peter Cox, Rhododendron expert, and son of the late E.H.M. Cox, a noted traveller in Burma in 1919; Sir Peter Hutchison with special interest in Primula; Roy Lancaster with considerable expertise of hardy trees and shrubs gained as former Curator of Hillier's Arboretum; and Robert Mitchell, Curator of the University of St. Andrews Botanic Garden, studying Trillium and Paris, and joint leader of the expedition.

Professor Feng Guomei, co-leader of the expedition, from Kunming Institute of Botany, Academy of Sciences of China, with eleven colleagues from his Institute, and guides, guards, local officials including a doctor provided by the leaders and elders of the local and Regional Governments, made up the party of about 25.

Expedition Members

Chinese Party from the Kunming Institute of Botany, Chinese Academy of Sciences.

Professor Feng Guomei (Joint Leader)
Ming Tianlu
Mrs. Fang Rhuizheng
Tao Deding
Guan Kaiyun
Li Chuenchao
Pan Hugen
Lu Zhenwei
Lu Renfu
He Qingen

Miss Gaby Lock (Exchange research student from Germany)
Professor Wu Chen-yih joined the party on 23rd May

British Party

Dr. David Chamberlain, Botanist, Royal Botanic Garden, Edinburgh
Peter A. Cox, Horticulturist, Glendoick, Perth
Sir Peter Hutchison, Amateur Biologist/Geographer, Milton, Dunbartonshire
Roy Lancaster, Professional Plantsman, Winchester
Robert J. Mitchell (Joint Leader), Curator, University Botanic Garden, St. Andrews
Tony Schilling, Deputy Curator, Royal Botanic Garden, Kew* (Wakehurst Place)

* Due to peritonitis, immediately prior to departure, Tony was unable to make the trip.

Itinerary

April	20	Leave Britain.
	21-24	Hong Kong (YMCA).
	24	Guangzhou by train (Tung Fang Hotel).
	25-29	Kunming (Government Guest House). Join up with botanical team from Kunming Institute of Botany, Academy of Sciences.
	30	Kunming to Xiaguan by road. Lunch Chuxiang. 13 hours journey. Based at Xiaguan in Government Guest House.
May	1	Left Xiaguan. Visited Erh Hai Park, Wenquan Hot Springs. Drive to Yangbi (Government compound).
	2-6	Camp 1. Dapingdi, Yangbi County (2,750 m).
	6-10	Camp 2. Shangchang, Yangbi County (2,700 m).
	10	Return to Yangbi. Meeting with leaders and elders.
	11	Return to Xiaguan (Government Guest House).
	12-15	Camp 3. Longquan Peak, Dali County (3,200 m).
	15	Return to Dali and Xiaguan.
	16	Sight-seeing around Dali.
	17-22	Camp 4. Huadianba, Dali County (2,900 m).
	22	Return to Dali. Meeting with leaders and elders, then to Xiaguan.
	23	Qingbixu Valley, Dali County, to 2,500 m.
	24	Santaipo, Weishan County, to 2,500 m.
	25-26	Division of specimens at Xiaguan.
	27	Xiaguan to Kunming (Government Guest House).
	28-30	Kunming.
	30	Flight to Guangzhou (Tung Fang Hotel).
June	1	Visit to Botanical Institute of South China. Evening flight to Hong Kong.
	2-3	Hong Kong (YMCA).
	3	Evening flight to London.

Expedition Details

Hong Kong 21-24 April

April 21 Arrive Hong Kong.

22 Lunch Government House. Tour of Victoria Peak.

23 Ma On Shan, Wu Kau Tang.

Kunming 25-30 April SBEC K1-172

April 26 Hua Hong Dong, Da Shao.

27 Kunming Institute of Botany.

28 Western Hills, Dragon Gate Temple, Taihua Temple.

29 Anning, Caa Xi Temple.

30 Drive to Xiaguan. 13 hours journey. (Lunch stop at Chuxiang).

Dali Bai Autonomous Prefecture 30 April - 27 May

May 1 Xiaguan. Erh Hai Park (1,966 m). SBEC 0001-0019

Wenguan Hot Springs (1,850 m).

Drive to Yangbi (1½ hours journey).

Dapingdi 2-6 May - Camp 1

May 2 Yangbi to Xieshanhe (1,800 m) by road. SBEC 20-54

Walk to Mahungou (2,050 m), Zhongshan, Wuantang (2,550 m), to Dapingdi Camp 1. (2,750 m) 10 km, 5 hours walk.

3 Dapingdi 2,700-3,000 m. Zhouzibai. SBEC 55-123

4 Duanqing 2,800-3,200 m. Sanchaohe 2,200 m. SBEC 124-191

5 Xieniupingdi 2,700-3,100 m. Dashichang 3,100-3,600 m. SBEC 192-260

6 Dapingdi to Camp 2. Shangchang (2,700 m). 35 km. 9 hours walk. Muofang-gou (2,400 m), Yangjiangping, Zaimen (2,300 m), Shangchang (2,400 m). SBEC 261-290

Shangchang 6-10 May - Camp 2

May 7 Shangchang to 3,000 m. SBEC 291-340

8 Jiucaipo 2,700 to 3,830 m. SBEC 341-377

9 Shangchang. SBEC 378-442

10 Return to Yangbi via Ziyang. SBEC 443-471

Longquan Peak 12-15 May - Camp 3

May 12 Left ridge to 3,000 m. SBEC 472-503

Minibus to 2,900 m. Walk to Camp 3.

13 Longquan Peak to 3,600 m. SBEC 504-551

14 Longquan Peak to 3,900 m. SBEC 552-588

15 Descent to Dali. SBEC 589-647

Huadianba 17-22 May - Camp 4

May 17 Wha Dien Bi 2,000 m, Fengyan 2,600 m to Huadianba 2,900 m. 7 hours walk. SBEC 648-716.

18 Xiaohuadianba to 3,100 m. SBEC 717-806.

19 Huadianba to 3,000 m. SBEC 807-903.

20 Wutaishan to 3,350 m. SBEC 904-972.

21 (1) Guanglanba to 2,980 m. } SBEC 973-1063.
(2) Xiaohuadianba to 3,250 m }

22 Return to Dali. SBEC 1070-1071.

Dali 23-26 May

May 23 Qingbixu, Dali County, to 2,500 m from Wengquan Hot Springs 1,850 m. SBEC 1064-1069: 1072-1151.

24 Santaipo, Weishan County, to 2,550 m. SBEC 1152-1225.

Miscellaneous collections. SBEC 1226-1235.

25-26 Division of sets of specimens between China and Britain.

27 Xiaguan to Kunming, stopping at Chuxiang (lunch) and 82 and 74 km from Kunming for Hypericum and Libocedrus macrolepis.

Kunming 28-30 May

May 28 Visit to Kunming Institute of Botany, Botanic Garden and Black Dragon Temple.

Packing of plants in crates after phytosanitary clearance.

29 Lectures delivered at Kunming Branch (Chinese Academy of Sciences) to the members of the Botanical, Horticultural, and Forestry Societies of Yunnan.

30 Flight to Guangzhou (Tung Fang Hotel).

Tour of city with courier from Academy of Sciences.

Guangzhou

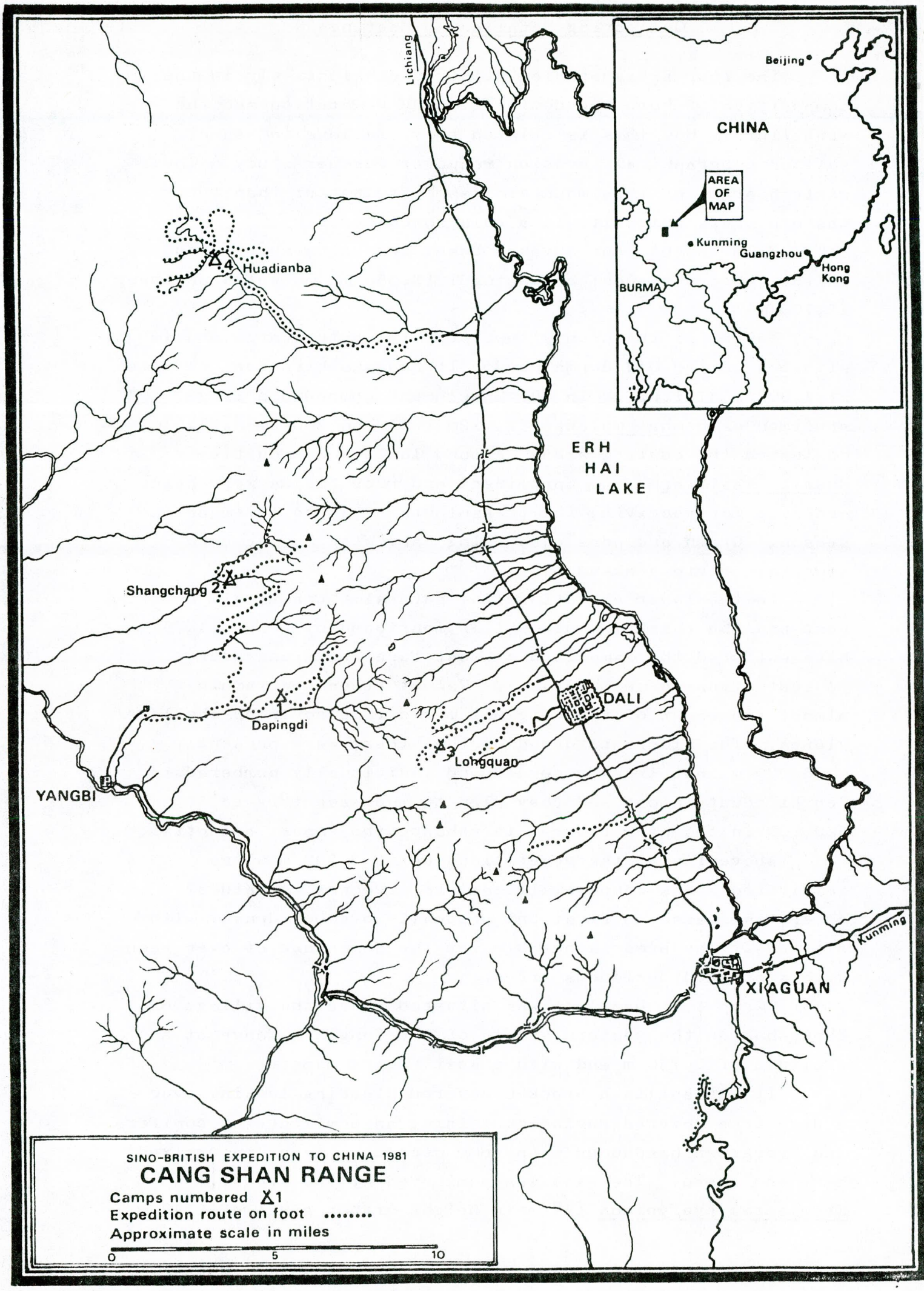
June 1 Visit to Botanical Institute of South China and its Botanic Garden. Evening flight to Hong Kong (YMCA).

Hong Kong

June 2 Phytosanitary inspection of plants at Government House. Visit to Department of Agriculture Herbarium.

3 Visit to Kadoorie. Lunch at Fanling Government Lodge.

Evening flight to London.


Lichiang
Beijing
CHINA
AREA OF MAP
Kunming
Guangzhou
Hong Kong
BURMA
4 Huadianba
ERH HAI LAKE
Shangchang 2
DALI
Dapingdi 1
3 Longquan
YANGBI
Kunming
XIAGUAN
SINO-BRITISH EXPEDITION TO CHINA 1981
CANG SHAN RANGE
Camps numbered 1
Expedition route on foot .....
Approximate scale in miles
0 5 10

Collecting Details and Meetings

The four areas studied differed distinctively in the composition of both the dominant woody vegetation and the herb flora. How this is related to variations in aspect, soil or geographical location requires further study. The western areas of this mountain range are wetter than the eastern areas which lie in a rain shadow area.

From Yangbi, our advance base, two camps were set up on the western slopes; at Dapingdi (2,550 m) and at Shangchang (2,700 m).

Yangbi is the county town of this western area and is situated on the Old Burma Road. It has a subtropical climate at 1,600 m altitude. In the Government compound a large specimen of Bombax malabarica, 22m tall and 200 cm at 1.5 m, dominated the central area. Around lowland communities Musella lasiocarpa was prominent and rice fields were being prepared for receiving the transplants prior to the monsoon season. Grain and peas were being harvested having been sown the previous autumn.

In the lower elevations the natural flora is all but gone and the thickly wooded hills mentioned by Baber (1879) have suffered the same fate as most forested areas near concentrations of populations. Walnut trees now remain almost alone out of the original mixed tree cover on the lower slopes. The Elders informed us that there were presently 270,000 walnut trees recorded and individually numbered in Yangbi county alone and they plan to increase this to 500,000 in the near future, to enhance the export potential.

Above Yangbi the vegetation, up to 2,500 m where cultivated areas round small hamlets give way to natural cover, is sparse at first but gradually becomes denser with altitude. The area is notable for the dominance of evergreens with scattered deciduous trees.

Camp 1 at Dapingdi was situated above the village of Zhongshan on the western slopes of the Cangshan Range at an altitude of 2,750 m and with a west facing aspect.

It was set in a bracken covered clearing looking over a deep tree covered ravine containing an admixture of conifers and evergreen hardwoods with some deciduous trees intermixed here and there. The site was dominated by two trees: Keteleeria evelyniana (18 m in height with a girth of 2.19 m

at 1.5 m) and Quercus gilliana (20 m high and 5 m in girth at 1.5 m). The open grazed area beyond contained 10 m tall trees of Rhododendron arboreum ssp. delavayi and Pinus yunnanensis with such herbaceous plants as Hemiphragma heterophylla, Erigeron breviscapis and autumn flowering gentians.

It took us 5 hours to walk the 10 km from Xieshanhe (1,800 m) to reach camp passing Mahungou (2,050 m) and Wuantang (2,550 m) as we climbed. Botanical specimens were collected near the track including an attractive Iris tectorum (SBEC 0031). The mules and ponies passed us with our baggage and food.

From this camp we could see the jagged ridge of the Cangshan Range some 2,000 m above and on some mornings covered with a fresh fall of snow.

Water was obtained from a spring some 80 metres from camp and food was delivered by mules and ponies to camp daily from Yangbi.

Camp 2 was established at Shangchang at 2,700 m. The 9 hour walk of some 35 km due north of Dapingdi was exhausting in the high temperature (25°C+), as we plunged downward into three ravines and up the other sides. On our route we passed the small hamlets, one with a school, of Mofanggou (2,400 m), Yangjiangping and Zaimen (2,300 m) where we stopped for our packed lunches by the side of the track. We reached the small hamlet of Shangchang (2,400 m) before the 300 m climb to our camp and were refreshed by mugs of tea presented to us by the inhabitants.

This area brough us among the Lisu race - a hill people and equally as jovial and generous as the Bai.

Camp 2 was situated in a valley below a steep hillside covered with deciduous trees, a complete contrast to the dominant coniferous and evergreen vegetation of Dapingdi. Here, too, the clearing was covered with bracken, and goats, cattle and pigs would be brought up to graze in this area daily.

Water was obtained from a spring just above the camp providing clear, cool water. Food and provisions were brought up daily by ponies returning to Yangbi with dried herbarium specimens.

From this camp the party collected on secondary ridges finding tall specimens of Pieris formosa 15 to 20 m high in dense woodland and Pieris formosa variety forrestii on the exposed ridge in full flower and showing its characteristic red young shoots.

On one occasion the main ridge was attained and the party could look down on the eastern slopes over the fertile Dali plain.

For our return to Yangbi from camp 2 at Shangchang we walked for four hours through dry hillsides with semi-terraced fields in the region of Zihang. The grain had been almost cleared from the fields and in the upper fields maize was intercropped with peanuts which we saw for the first time. Elsewhere we had seen maize planted with either climbing beans or cucurbits.

In the lower fields water buffaloes were preparing the flooded fields for the rice crop - some had already been transplanted by working teams.

Meeting with Yangbi Elders

While we camped at Shangchang we could detect signs of at least 12 major forest fires away to the west and at high altitudes. Knowing the vulnerability of the thin, but humus-rich soil, we were alarmed at the devastating effect on the sensitive ecosystem.

We suggested to the Elders that this burning of the high altitude forest would have a most serious effect on what remains of the forested areas (60% of Yangbi County) - weather changes, massive soil erosion, loss of plant resources and a barren hillside. They related that weather changes had already been noticed and plans were afoot to attempt to stop this practice of burning which has been going on for centuries. It is not an easy task, but a very important one.

For the Institute of Botany in Kunming, Professor Feng supported our concern for the forest areas and suggested conservation and planting of native trees. (See Appendix 5 for further report).

Yangbi Leaders and Elders

Zhi Genmae	-	Vice County Magistrate
Zhang De		" " "
Gao Chong		" " "
Wang Chaodang		" " "
Tang Zhenke	-	Head of People's Congress of the County
Ju Baogui	-	Elder of County
Zhu Yuanzhong		" " "
Li Cuenshi		" " "
Li Chaoyong		" " "

Following the banquet with the Elders, both Professor Feng and R.J. Mitchell thanked them for their courtesy in allowing the expedition to visit Yangbi County and to the remote area of Dapingdi and Shangchang. It was a great provilege for the British team to be the first foreign visitors to this part of Yangbi. We both thanked them for their considerable help in supplying mules and ponies to convey our equipment, tents and food and without their help it would have been impossible to progress.

We reported that 471 collections had been made during our stay in Yangbi county and expressed the hope that this would not be the last visit by botanists to their area.

The Elders pressed us to stay longer with them, but alas our programme was fully occupied and regretfully we had to leave them.

Eastern Flank of the Cangshan Range

From Xiaguan and Dali in Dali County, two further camps were established at Longquan Peak (3,200 m) and at Huadianba (3,000 m). There was a day outing from Xiaguan to Qingbixu, a steeply sided valley with access to 2,500 m altitude and in Weishan County to the south a day outing to Santaipo reaching a height of 2,550 m.

The mountain range on the eastern flank rises precipitously above the fertile Dali plain, with deep ravines and narrow lateral ridges, making access to the higher elevations very difficult.

The plain, some 48 km long and up to 5 km wide, slopes

gently from the base of the mountain range to Erh Hai Lake, which is rich in fish. Cropping on the plain with its frost-free climate is based on two major crops per year. Autumn sown wheat, barley is followed by rice transplanted prior to the monsoon rains in June.

Roadside planting of Eucalyptus dominated the flat landscape and oil was being extracted from leaves and branches along the route.

Camp 3 was situated on a rocky ledge at 3,200 m, the highest of our four camps, and overlooking the walled city of Dali, seen to the east through a deep ravine with a gushing stream 500 m below camp. To the west the steep craggy slopes were covered with Abies delavayi, the dominant tree at this altitude. Majestic specimens of 15-16 m clung to the slopes and craggy outcrops but at 3,900 m it takes the form of krumholz only 1.5-2 m high. This fir here in its locus classicus, dominates the dense bamboo stands through which numerous species of Rhododendron were found.

Porters were used to carry the supplies to camp 3. Water was obtained from a nearby stream and this was the only time we were concerned about the quality of the water. In every case water was boiled before using it and therefore any organisms present would be killed off. In any event no-one suffered any discomfort during the period of the expedition or subsequent to it, thanks to the efforts of the Chinese cooks and the diligence of the members of the expedition. (See medical report on page 73).

We returned to Dali by the lateral ridge which extended almost to the plain. During the descent we sampled the vegetation collecting herbarium specimens, seeds and plants, and returned to Xiaguan to press the herbarium material and to tend the plants for which a cool shady room with a stone covered floor was set aside.

This was the first time all the plants were together and it was therefore a useful period to take stock and repack the plants and check their labels. The meticulous care given to the plants by Peter Cox and Peter Hutchison resulted in a very highly successful introduction and to their great credit.

Camp 4 at Huadianba at 2,900 m was the first under cover of tiled roofs in farm buildings on the floor of a high valley.

In earlier days a road connected this farm with the plain, but extensive erosion had washed away major sections in the steep areas and these had not been restored. Pony trains regularly ply this route and herds of goats are brought up to pasture in the grassy areas.

The farm specialises in growing medicinal plants and the fields, round the farm and its several outlying communities, were carefully tended. The crops grown for homoeopathic medicines were:-

Aconitum used for arthritis and as a tonic

Angelica sinensis

Fritillaria cirrhosa as a cure for coughs

Rheum officinale the rhizome of which was used for digestive complaints, and

Saussurea lappa for digestive ills and as an antibiotic.

There were also a few old apple trees around the farm itself.

It took seven hours to walk into camp botanising as we progressed, bipassing coppiced woodland covered hillsides containing a rich assortment of plants. Nearing the farm and at about 2,700 m peaty meadowland with streams provided a haven for the candelabra primula, P. poissonii. On either side were tree covered hillsides and to the west were numerous side valleys in varying degrees of steepness and length. These led up to the main ridge of the Cangshan Range. On the east above the steep hillside where, around the farm, fields utilized what level ground there was available, an extensive plateau is surrounded by hills at 3,100 m, where alpine plants and dwarf rhododendrons carpetted vast areas. Here a herd of 400 yak grazed during the summer months.

This area produced the most diverse habitats from boggy marshland and damp secluded valleys to high plateau and coppiced hillsides rich in species. The collection of 423 herbarium numbers reflects the richness of this area.

Food was readily available at this camp with yak meat a feature of several meals.

Meeting with Dali County Elders

On our return to Dali from Huadianba a banquet was arranged and thanks were recorded to the Leaders and Elders present for their courtesy in permitting the expedition to visit Dali County. This had been a profitable area botanically and we thanked them for their considerable help with porters and mules to carry our equipment, stores and herbarium material.

Professor Feng Guomei also conveyed the thanks of the Institute of Botany for their considerable help and especially for permitting the expedition to use the buildings of the medicinal farm. Professor Feng had been a most instructive and valuable companion with his lifetime knowledge of the plants of Yunnan in the field.

Dali County Leaders

Tang Hongqing	-	County Magistrate
Zhang Guobeng	-	Head of Dali County Government Office
Zhao Tuseng	-	Head of the Medicinal Farm

Professor Wu Chen-yih, R.J. Mitchell and Professor Feng Guomei.

Photography by Professor Wu.

Day Trips from Xiaguan

Qingbixu, Dali County, on 23rd May

This side valley, some 8 km from Xiaguan and about half way to Dali, proved to be botanically rich in species. It is reached by a track leading through fields and the village of Wanquan to the rocky slopes above where there are an abundance of graves. Crossing the stream the track leads up into a steeply sided ravine of scrubby vegetation which contains a great variety of species. Here Hypericum sp. nov. No. 1 was found together with H. sp. nov. No. 3.

On the mossy covered rocks Primula sino-listeri and P. membranifolia grew with Begonia taliensis and the orchid Gastrochilus cf. pseudodistichum.

Deutzia calycosa, Berberis davidii and Jasminum officinalis were prominent shrubs, with Polygonatum, Euphorbia and Viola and in a variety of species as prominent herbs with Phtheirospermum tenuisectum abundant in places. Rhododendron maddenii ssp. crassum and R. pachypodum occurred on steep rocky slopes. The valley ended in a steep rock face with a waterfall at 2,500 m.

Santaipo, Weishan County, on 24th May

Due to the rains we collected on the roadside bankings here about 17 km south of Xiaguan at an altitude variance of some 2,100 m and 2,550 m. This area was covered with scrubby growth of Quercus semecarpifolia, Castanea, Cyclobalanopsis, Castanopsis, Rosa longicuspis, Elaeagnus umbellata, Gaultheria forrestii, Vaccinium sprengelii, Rhododendron yunnanense showing variation into R. rigidum, and R. decorum.

Plants which attracted attention were Mahonia longi-bracteata, Viburnum chingii, Deutzia rehderiana and Polygalla arillata with large yellow flowers and a pink form of Rosa longicuspis. Attempts to bring scion material of this clone failed to take, alas. We collected 67 herbarium numbers on this visit showing the wealth of species growing here.

On these two day outings Professor Wu Chen-yih joined the expedition. He has known this area for over 35 years and therefore was able to relate its changes over the years.

Meeting with Dali Bai Autonomous Prefecture Leaders

At the end of the month long expedition we met again with the leaders of the Prefecture. Following a speech of welcome, Professor Feng thanked the Government officials for their considerable help and these reflected the thanks of the British members. Following a meal of Dali delicacies, we thanked Professor Wu, who had joined the expedition for the last 2 days, and Professor Feng of the Kunming Institute of Botany for arranging the itinerary and ensuring that everything went like clockwork; the Prefecture leaders for allowing us to visit the area and to study the vegetation and for their help in arranging our passage; the Liaison Officer who was in charge of logistics; the cooking staff for producing good meals at the camps; the doctor who had helped so much towards the health of the party; the Institute members who had been so patient and so helpful and who had helped to make the expedition far surpass our wildest dreams; and to the Leaders of the communities we visited in making us so welcome.

The Leaders present were:

Zhu Jaixiang - Vice Chairman
Si Zangli - Head of Regional Government Office

Gaby Lock, Mrs. Fang and Peter Cox collecting and recording Rhododendron fastigiatum as two guides look on, in Dali County.
Photograph by R.J. Mitchell.

Kunming Banquet

Our final banquet in Kunming brought to the end our happy, exciting and hard-working joint botanical expedition. It was in a relaxed atmosphere in the Guest House in Kunming that we toasted each other, hoping for further joint ventures but thankful that the expedition had been so successfully completed without mishap or injury.

To the Kunming Institute members we record our most sincere thanks and gratitude for organising the expedition, choosing the sites so well and for unstintingly and unsparingly doing everything in their power to make our visit so rewarding and enjoyable.

Together with the expedition members present at this last banquet, we were honoured with the presence of:-

Xi, Da - Vice Director of the Kunming Institute of Botany

Duan, Taohua - Vice Director of the Kunming Institute of Botany

Professor Zang Mu - also of the Institute.

Recording and pressing specimens after a day's collecting. Professor Feng (centre), with Roy Lancaster recording British field notebook and Mrs. Fang, the Chinese records.

Photograph by R.J. Mitchell.

SBEC "K" Collections

From the Chinese point of view these did not constitute part of the detailed study of the Cangshan Range. Most were mainly collected in the environs of Kunming, hence the prefix "K". Sets of these herbarium specimens were of no interest to the Institute of Botany and in any case only 1 or 2 sets were collected of the total of 177 numbers which included seed and plants without voucher specimens. Some material was also collected in Hong Kong.

On arrival at Kunming the members of the Institute suggested we participate in field outings to the western hills taking in some Temples as well. It was on these outings that plants were collected.

Hua Hong Dong, near Kunming

This very barren area in the western hills is dominated by Cupressus duclouxiana and Keteleeria evelyniana growing amid the sparse vegetation. The vegetation is dwarfed by drought, by deprivations on the plant community, yet still able to flower and seed. Here Hypericum sp. nov. No. 3 grew with Berberis ferdinandi-coburgii var. vernalis, Clematis chrysocoma, Lyonia ovalifolia and Vaccinium fragile.

Pink flowered Indigofera rigioclada and Jasminum beesianum contrasted with the yellow flowers of Stellera and the blue of Cynoglossum amabile or the white of Sophora davidii and Bauhinia brachycarpa var. microphylla. Myrica nana occurred as dwarf evergreen bushes with round spiky balls of developing fruit while the ruscus-like flowers of Helwingia chinensis gave added interest. Dashao that same afternoon at 2,400 m, higher by 400 m than the morning site, proved equally exciting. Here on steep banks amid cultivation a dominance of evergreen shrubs and trees gave shelter to a rich herb layer including Cymbidium and Scutellaria amoena.

Here Pinus yunnanensis intermixed with Ternstroemia gymnanthera, Michelia yunnanensis and Camellia saluenensis and such ericaceous subjects as Rhododendron spinuliferum, R. scabrifolium var. spiciferum and their hybrid R. x duclouxii, R. decorum and R. siderophyllum, Vaccinium fragile and V. sprengelii and Lyonia ovalifolia, while vast

areas of hillside were covered with the deep pink flowering Rumex hastatus.

Western Hills - Dragon Gate Temple

The steeply wooded slopes contain a variety of species including Pinus armandii with some P. yunnanensis and Cupressus duclouxiana. Pistacia chinensis was prominent and Viscum liquidamberifolium occurred as large growths on several trees.

Here Hedychium spicatum, Clerodendrum fragrans and Leptodermis tomentosa caught the eye.

Tai Hua Temple

About 15 km from Kunming this temple is surrounded by tall trees, some very old, and Pinus armandii is the dominant conifer although Quercus senescens, Celtis biondii and Alnus nepalensis were among the trees collected.

Inside the temple grounds Toona sinensis growing to 10 m dominated one courtyard while Paeonia lactiflora and P. yui Feng differing in its pubescent ovary grew with Corydalis taliensis in the temple grounds among the rocks. Symplocos paniculata and Machilus longipedicellata were among the prominent native woody plants nearby and in sunlit clearings a minute many headed Gentiana with pale blue flowers was widespread.

Anning and Caa Xi Temple

Some 42 km southwest of Kunming lies the small community of Anning. The area round the Temple and in dry woodland grew Sapindus delavayi, Pistacia chinensis and P. weinmanniifolia, Sophora davidii, Albizzia mollis, Viburnum punctatum and Pittosporum brevicalyx. Jasminum mesneyi, Osmanthus yunnanensis and Berberis grew in a copse with Clematis armandii. On shady mossy rocks Peperomia reflexa gave indication of the low altitude - 2,025 m.

Several other collections were made en route to Xiaguan and on the return journey, and further collections, mainly of seed and cuttings, from the environs of Kunming and Hong Kong.

Division of Specimens

During the expedition up to 8 sets of each number were collected and the sets were divided in half as follows:

China sets 1, 4, 5 & 8
Britain sets 2, 3, 6 & 7.

The British sets are deposited in Edinburgh, Kew, St. Andrews and Arnold Arboretum, U.S.A. The Chinese sets are for Kunming, Peking and possibly Xiaguan, where a survey of the vegetation is being conducted with the Kunming Institute of Botany to assess the wealth of plants for Nature Reserve status. Currently the Abies delavayi population is also being monitored.

The complete set of herbarium specimens is held in Kunming and Edinburgh has the fullest British set.

Plants

In all, 700 plants were brought back. Phytosanitary certificates were issued by the Chinese Authorities in Kunming and by the Hong Kong Department of Agriculture. On arrival, the plants were placed in strict quarantine at the Royal Botanic Garden, Edinburgh, under the surveillance of the quarantine officer, Dr. Roy Watling. Plants remained in isolation for six months, the bulbous material for 12 months.

Collections were dispersed to Edinburgh (full set), Kew and St. Andrews and members of the expedition received special collections depending on their interest. Where specialist research is being conducted, plants were released to them: Pleione (Kew & Leeds), Sorbus (Liverpool), Paris (St. Andrews), and Hypericum (British Museum).

Seeds

Seed collected was distributed to the institutions already mentioned, to the expedition members and to the sponsors who expressed an interest in having seed. Germination of most numbers has been good and we await details of the plants progress.

Acknowledgement is herewith gratefully expressed to Peter Cox and Peter Hutchison for the skillful way in which

they monitored and maintained the collection of plants and seeds to arrive back in Britain in good order.

A few plants did not survive the rigours of quarantine and the forever changing temperatures en route from Xiaguan to Britain.

Many plants have been introduced to cultivation in Britain again and some like Paris violacea, Androsace rigida var. minor, Gentiana melandriifolia and ternifolia, Corydalis curviflora var. rosthornii, Diapensia bulleyana etc. for the first time.

The true Pleione forrestii has been introduced for the first time and the previous collection of Forrest, found to be a hybrid, given the name Pleione x confusa.

Lectures given

On 29th May to a gathering of about 100 members from the Botanical Society of Yunnan, the Horticultural Society of Yunnan and the Forestry Society of Yunnan - a joint meeting was held in the Kunming Branch of the Chinese Academy of Sciences, and with Professor Wu Chen-yih, Chairman of the Branch, present. Professor Feng Guomei acted as Chairman and introduced us in turn to the members. Guan Kaiyun translated as we gave our lectures. It took all day, from 9 a.m. to 5.25 p.m. with a break for lunch of 1½ hours.

The sequence of lectures was as follows:-

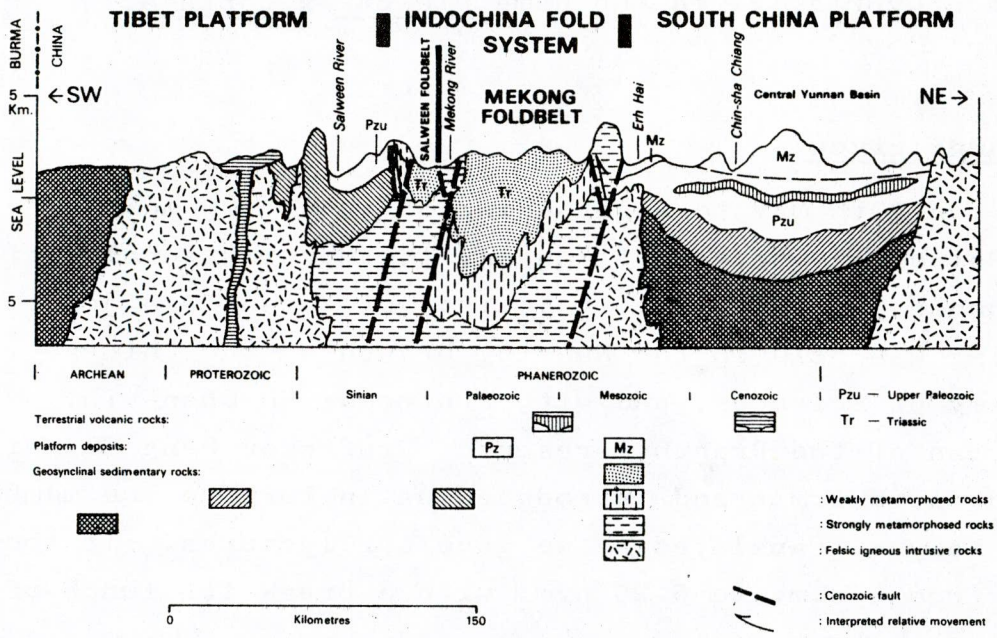
9.00	- 10.10	The role of St. Andrews University Botanic Garden and the value of Rhododendrons in Teaching. R.J. Mitchell.
10.15	- 11.30	The Introduction of Chinese Plants to British Gardens. R. Lancaster.
11.30	- 12.30	Question Time.
2.00	- 3.30	The Cultivation of Ericaceae in Britain. P. Hutchison & P. Cox.
3.30	- 5.25	Rhododendron Distribution Patterns. D. Chamberlain.

The audience were most attentive and appreciative. Outlines of the lectures were to be published in Acta Botanica Yunnanica.

The Geology of the Dali - Yangbi Area

Mrs J.S. Kinnaird
St. Andrews University

The area between Dali and Yangbi forms part of the Mekong Fold Belt which extends from the Kunshan area north-west of Yangbi County 700 miles south-eastwards along the Mekong River and across the border into Laos and Vietnam. It is bordered to the west by the massive Himalayan fold system and to the east by the South China platform of old stable rocks also known as the Yangtze Craton (see sheet 2 of GSA maps).



The Mekong Fold Belt was part of the Northern Tethyan or Mesogean geosyncline during the Palaeozoic with the South China Platform also known as the Yangtze Craton to the east. The geosyncline at its most extensive stretched from Indonesia northwards and westwards through the Himalayas, Afghanistan and the Soviet Union into Europe to include the Mediterranean and Alpine areas. The sea is today reduced to a western remnant, the Mediterranean Sea. The Tethyan geosyncline was bounded to the north by the northern Asiatic continent which was separated from the stable central China continent by the central Asian geosyncline. To the south lay the continental mass of Gondwana including Australia, peninsular India, Arabia and

* Geological section through the Cangshan Range.
(By kind permission of Geological Society of America and Dr. Maurice Terman, Principal Compiler).
Drawing by St. Andrews University Cartography Services.

central Africa.

Within the Tethyan geosyncline a sequence of sediments were deposited. These included conglomerate, sandstone, shale limestone with volcanics also deposited to form a sequence which reached 15,000 feet in thickness in Tibet. To the east on the old rocks of the Yangtze Craton, Cambrian shales grading up into Ordovician limestones were succeeded by shale, sandstone, limestone sequences in late Ordovician. Such sedimentation lasted until late Silerian when the area was uplifted into a platform area.

During the upper Palaeozoic geanticlinal uplifts within the northern Tethyan geosyncline formed northwest, southeast orientated landmasses from which great thicknesses of clastic sediment were eroded and deposited during the Devonian and early Carboniferous. More than 15,000 feet of Devonian sediments were deposited in the central part of the geosyncline.

During the late Palaeozoic there were only two global landmasses; Laurasia to the north (North America and Eurasia) with Gondwanaland to the south (southern continents and India). These two continents were separated by a rather narrow ocean. The late Palaeozoic was a time of tectonic activity related to collision of tectonic plates associated with the completion of joining of the two supercontinents to form one landmass - Pangaea.

During the folding that accompanied plate collision large igneous batholiths were intruded into a sequence of sediments that had been regionally metamorphosed. The heat for this metamorphism had been the result of deep burial and frictional heat generated along the subduction zone would locally melt the crust to create molten rock which rose up to form the granodiorite batholiths.

The whole history of the inter-relationship of plate movement is very complex. After the formation of the supercontinent tectonic activity subsided for a while and in the Yangbi area limestones and coal appear to have been deposited on the metamorphosed sediments beneath. By Jurassic times the supercontinent of Pangaea began to break up: Eurasia was separating from Africa and Australia, India and Antarctica were separating away from Africa. At

the same time North and South America were separating from Europe and Africa. The tectonic activity reached its maximum during the Tertiary with the formation of the Alpine chain and Himalayan belt. The latter was formed as the Indian subcontinent collided with the Eurasian continent. Later tectonic activity led to faults in the Yangbi area which were responsible for the downfaulted trough which formed the Cangshan Range.

Specimens from China

1.	chlorite mica schist	Yangbi County - Dapingdi	Alt. 2700m
2.	chlorite mica schist	" " "	2800m
3.	chlorite mica schist	" " "	3000m
4.	? acid tuff - volcanic rock	" " - Shangchang	2600m
5.	chlorite mica schist	" " "	3000m
6.	chlorite mica schist	" " "	2800m
7.	quartz mica schist	Dali County - Longquan Peak	3000m
8.	granodiorite (igneous rock)	" " " "	4000m
9.	marble = metamorphosed limestone	" " " "	3200m
10.	dolomite limestone	" " - Huadianba	3600m
11.	chlorite mica schist	" " "	3200m

Chlorite mica schist represents a muddy sediment that has been regionally metamorphosed - such rocks are characteristic of low grade metamorphism which has been produced by burial and perhaps mountain building and not by localised heat of an intrusion.

Specimen 10 appears not to have been metamorphosed so is probably considerably younger than specimens 1-8, 9 and 11. The granodiorite was probably intruded during the mountain building processes after the limestone and mudstone succession had been metamorphosed to marble and chlorite mica schist. Weathering of these rocks would produce the following elements in the soil:-

9. marble $CaCO_3$
10. dolomite limestone - $CaCO_3$ + some $CaMg(CO_3)_2$
4 & 8. tuff and granodionite contains quartz SiO_2 + feldspar KAI Si_3O_8 or $(Na_1Ca)Si_3O_8$ + minor ferromagnesium minerals
1-3, 5-6, 11. chlorite mica schist.

The mica is probably biolite with idealised formula $K(Mg_1Fe)_3AlSi_3O_{10}(OH)_2$. This would break down under acid conditions to give hydrated alumino-silicate silica and the release of K_1Mg and Fe ions.

The chlorite behaves similarly - an idealised formula would be $Al(Mg_1Fe)_5AlSi_3O_{10}(OH)_8$.

Dominant Woody Vegetation at Expedition Camps on Cangshan Range

Roy Lancaster

All four camps have shown distinct differences in the composition of the woody vegetation. Whether due to aspect, soil precipitation, or other factors only a longer, more detailed study will determine but the following observations and lists will give some impression of the major and more obvious patterns.

Camp 1. Dapingdi

This was situated above the village of Zhongshan on the western slopes of the Cangshan Range in Yangbi County at an altitude of 2,550 m and with a west facing aspect.

This area was notable for its dominance of evergreen tree species with a scattered population of deciduous species. The major evergreen species were Keteleeria evelyniana, Lithocarpus dealbata, Lithocarpus leucostachys, Castanopsis orthacantha, C. concolor, a Quercus as yet undetermined, possibly Quercus gilliana, Schima yunnanensis and Rhododendron arboreum ssp. delavayi.

Smaller evergreen trees included Skimmia laureola ssp. multinervia, Rhododendron spp., Craibiodendron yunnanensis, Schefflera spp., Myrsine semiserrata and Cornus oblonga.

Deciduous trees associated with the above but never dominant included Alnus nepalensis, Sorbus spp., including S. rufopilosa and a species of the Aria group, Quercus aff. aliena, Acanthopanax evodiifolia, Meliosma cuneifolia and Populus adenopoda. Lyonia ovalifolia, a deciduous species, while mostly shrubby, attained tree size (12 m) in sheltered forest.

Higher up above Camp 1, 2,800 m and above, other tree species became apparent. Evergreen species included Tsuga dumosa, Juniperus recurva, Taxus yunnanensis, Ilex dipyrena, Rhododendron sinogrande, Pinus armandii and P. yunnanensis while the deciduous trees included Magnolia campbellii ssp. mollicomata, Acer flabellatum var. yunnanensis, Acer

forrestii, Litsea cubeba and L. rubescens, Lindera praetermissa, Sorbus aronioides and S. ochracea and Salix guebrianthiana. In one particular area - a depression in the valley at 2,850 m - virgin forest remained and contained among other fine trees a huge (30-40 m) specimen of Lithocarpus leucostachys, Rhododendron sinogrande, one measuring 13 m in height with a girth of 126 cm at 1.5 m, Taxus yunnanensis a huge spreading specimen, 14 m high, and a Sorbus, probably S. rufopilosa 12 m tall.

In the areas around Camp 1 large mature trees were few. Two such specimens however occurred close to the campsite - Keteleeria evelyniana 12 m x 219 cm at 1.5 m and an evergreen Quercus 20 m x 500 cm at 1.5 m.

The shrub flora throughout the area was varied but with members of the Ericaceae dominant, especially at the higher elevations, where the genus Rhododendron was a feature. The main genera otherwise represented were Vaccinium, Gaultheria, Aganetes (A. mannii) as an epiphyte, Viburnum, Zanthoxylum, Sarcococca, Lyonia, Lonicera, Rubus, Litsea, Lindera, Daphne, Ilex, Corylus, Cotoneaster, Berberis, Eurya, Symploccos, Illicium, Euonymus, Osmanthus, Hypericum, Ribes, Rosa and Pieris.

Climbers and Lians were represented by Clematis montana, including var. grandiflora, Hydrangea anomala, Holboellia latifolia, Holboellia angustifolia, Smilax menispermoides, Aristolochia moupinensis, Euonymus vagans and Photinia integrifolia.

Bamboos dominated the understorey in Rhododendron forest above 2,800 m and were mainly Sinoarundinaria species.

Camp 2. Shangchang

This camp was situated in a valley on the western slopes of the Cangshan Range, Yangbi County, at a height of 2,700 m on a northwest facing hillside.

Compared with Camp 1 this area was immediately identified by the dominance of deciduous trees, especially in the river valley and on the hillsides above camp. Many exceeded 15 m including Fraxinus paxiana, Styrax ? schweliensis, Acer franchetii, Acer tetramerum, Populus adenopoda, Acer flabellatum var. yunnanensis, Corylus

possibly C. tibetica, Sorbus aff. pallescens, Magnolia campbellii ssp. mollicomata, Photinia spp. Quercus dentata, Cladrastis sinensis and Pterocarya delavayi.

Smaller deciduous trees included Acer davidii, one specimen to 13 m, Acer forrestii, Acer cappadocicum var. sinicum, Salix spp., Lyonia ovalifolia, Euptelia pleiosperma, Styrax grandiflorus and Lindera praetermissa.

Of the evergreen trees present the following were the most notable: Lithocarpus spp., Cyclobalanopsis delavayi and C. glaucoides, Taxus yunnanensis, Rhododendron sinogrande, Cinnamomum glanduliferum, Cornus oblonga, Cornus capitata, Schima yunnanensis and Ilex fragilis f. kingii.

In the higher regions on the eastwest ridge upwards of 3,000 m the genus Rhododendron became increasingly dominant with other evergreens such as Juniperus recurva, Juniperus squamata and Ilex delavayi.

The few deciduous woody plants, mainly shrubs, to accompany the rhododendrons at the higher elevations included Viburnum cordifolium, Ribes acuminatum and Rosa sericea var. omeiensis.

As in the previous area the shrub flora in the vicinity of Camp 2 was varied and included the following: Viburnum chingii, Deutzia calycosa, Daphne papyracea, Camellia pitardii var. yunnanica, Buddleia myriantha, Helwingia japonica, Berberis davidii, Rubus including R. tricolor and R. pentagonus which together formed dense carpets on the edge of forest, and in clearings - Sarcococca, Lindera spp., Helwingia spp., Pieris formosa var. forrestii, Osmanthus delavayi, Vaccinium spp., Ribes spp., Gaultheria spp., Hypericum spp., Lonicera spp. and Indigofera spp.

Climbers and lians included: Photinia integrifolia, Clematis montana, Hedera nepalensis var. sinensis, Hydrangea anomala, Smilax biumbellata and Rubus paniculatus. Bamboos, mainly Sinoarundinaria ssp., were dominant as undergrowth in the Rhododendron forest above 2,900 m.

Camp 3. Longquan Peak

On a rocky ledge half way up the hillside on the eastern slopes of Cangshan Range above Dali, Camp 3 was established at a height of 3,200 m. The aspect was east

southeast, facing a hillside across a deep ravine and with the northsouth main ridge above.

In this interesting area evergreen trees tended to dominate. The camp site was situated at a useful level where several coniferous species overlapped. From lower levels arrived Pinus armandii giving way to Pinus yunnanensis, a few specimens of Juniperus recurva and Tsuga dumosa, and the early preserve of Abies delavayi (here in the type locality) which became the dominant tree above 3,500 m. Other evergreen trees at campsite level included Lithocarpus spp. Deciduous trees included Populus adenopoda, Sorbus rehderiana and S. rufopilosa.

Higher on the same hillside Rhododendron rex ssp. fictolacteum assumed tree size but apart from this, the woody flora was shrubby and the understorey to Abies was dominated by Rhododendron, several species of bamboo - possibly Sinoarundinaria - Viburnum cordifolium and Ribes glaciale. This proved to be a poor representation compared with the area around Camp 3 where the following shrubs were among those to be found: Rosa sericea var. omeiensis, Syringa yunnanensis, Hypericum spp., Mahonia longibracteata, Clethra delavayi (in its type locality), Pieris formosa, Hydrangea spp., Spiraea myrtilloides, Jasminum diversifolium, Dipelta yunnanensis, Rubus spp., Deutzia calycosa, Vaccinium delavayi, Gaultheria forrestii, Lyonia ovalifolia, Cotoneaster spp., Lonicera spp., Salix cathayana and Litsea sericea. Climbers included Clematis and Schisandra spp.

On the crest of the ridge few woody plants thrive and on slopes at 3,900 m the main species appeared to be Rhododendron fastigiatum, R. taliense, R. balfourianum, Juniperus squamata and a prostrate Salix.

Camp 4. Huadianba

Huadianba is a medical farm nestling in a valley at the northern end of the Cangshan Range in Dali County at a height of 2,900 m. The areas examined included side valleys with an eastwest orientation from the dominant ridge and a west facing hillside and alpine valleys, east of and above the village.

This was in many ways the most interesting and productive area of the four studied for it incorporated several distinct terrains. Firstly, in the valley bottom peaty soils and bogs dominated where little but shrubs grew between cultivated areas. These included Lonicera spp., Rosa sericea var. omeiensis, Berberis spp. and Rhododendron spp. Secondly, in an area of secondary vegetation, cut over at regular intervals by the local people, was dominated by such deciduous trees as Populus adenopoda, Populus yunnanensis, Alnus ferdinandi-coburgii, Sorbus rufopilosa, Sorbus aff. pallescens, Acer forrestii, Malus yunnanensis, M. hupehensis and Ulmus cf. bergmanniana.

Evergreen trees were present though fewer species were represented and were kept artificially low by coppicing. They included Pinus yunnanensis, Quercus semecarpifolia and Lithocarpus species.

A fairly rich shrub layer included Berberis levis, Ilex yunnanensis, Salix spp., Litsea cubeba, Buddleia myriantha, Aralia chinensis, Pieris formosa, Rhododendron spp., Rosa sericea var. omeiensis, Lyonia ovalifolia and Gaultheria forrestii.

Thirdly, the side valleys and ravines running east-west in the east facing flank of the main northsouth range.

Although these valleys agreed in basic species most contained Tsuga dumosa, Sorbus spp., Pinus armandii, Meliosma spp., Populus adenopoda, Malus spp., Prunus spp., Acer spp. and Lithocarpus.

They each contained plants not necessarily found in its neighbours. i.e. two valleys A & C separated by valley B.

In A Acer caudatum var. georgei was plentiful but not found in C.

An A Rhododendron rex ssp. fictolacteum formed forest but was poorly represented in C.

In C Rhododendron sinogrande, Magnolia campbellii ssp. mollicomata, and Betula utilis were common but were not found in A.

In C a Populus with large leaves was plentiful including one specimen suckering from the base of a

formerly large tree, (Girth at 1.5 m 3.76 m), was not found in A.

In all valleys bamboo - mainly a Sinoarundinaria was the dominant understorey beneath Rhododendron above 2,900 m.

Fourthly, the west facing hillsides above the village contained the same basic woody species as those on the opposite side of the valley though Cyclobalanopsis delavayi and Quercus semecarpifolia and Q. aff. pannosa were more dominant as scrub, and such shrubs as Paeonia lutea, Lonicera setifera, Prinsepia utilis and Cornus were more in abundance.

Over the crest of the ridge at 3,100 m lay several grassy depressions, alpine valleys grazed by yak and surrounded by minor hills, in some of which ravines were found. Here trees, natural or coppiced, were absent and the tallest woody vegetation was little more than 5 m tall. Most of the hillsides in this elevated area were clothed in dwarf Rhododendrons, dwarf Berberis, creeping Salix, Quercus semecarpifolia and Stellera chamaejasme.

In the ravines and sheltered depressions shrubs formed mixed thickets mainly composed of Rosa sericea var. omeiensis, Berberis spp., Cotoneaster spp., Lonicera spp., Rhododendron yunnanense and Syringa yunnanensis.

On one exposed limestone hill rising above the alpine valley and typical of many in this area, the main woody vegetation consisted of low mounds of Pinus yunnanensis and Quercus semecarpifolia between which prostrate Juniperus squammata occurred. At the summit of the hill at 3,250 m apart from the aforementioned, Ephedra, possibly E. likangensis, and Berberis, possibly B. taliensis, were the only other woody species although on the more sheltered east facing slope Rhododendron yunnanense occurred in a dwarf form.

On an east facing hillside in the main approach valley to Huadianba at an altitude of 2,700 m we found an excellent example of restricted distribution in Magnolia wilsonii (Syn. M. taliensis). There were many more similar examples.

Some Preliminary Comments

The Cangshan is the type location for a number of woody plants and certainly the British members of the expedition were pleased to see such examples as Abies delavayi, Clethra delavayi, Berberis taliensis and probably Pieris formosa var. forrestii, the latter possibly in the same place as originally collected by Forrest or his collectors.

A number of trees and shrubs introduced by the expedition to Britain as seed or live material constitute the first of their kind. They include Viburnum chingii Tsu a species only recently described. It is a deciduous species of suckering habit to 2 m with obovate to elliptic, short, acuminate leaves 5-6.5 cm long. The tubular pink-tinted white flowers 8 mm long are borne in terminal downy racemes on downy stalks. It should prove a valuable addition to those species already in cultivation.

Deutzia calycosa Rehder is a species we found to be common in the Cangshan. It is closely related to D. purpurascens (L. Henry) Rehder differing mainly in calyx details. Like the last species D. calycosa is a deciduous shrub of 6-7 ft with white flowers stained purple without, borne in rounded corymbs in May and early June.

Spiraea japonica L. var. acuminata Franchet is a deciduous with flowered shrub and a variety of a widely distributed species.

Craibiodendron yunnanense W. W. Sm.* A large shrub or small tree, evergreen with glossy-green lanceolate long-pointed leaves coppery-red when young. The small white flowers are borne in terminal and axillary panicles.

A number of Hypericum species were collected both as dried specimens and seed. Early indications are that several are new to cultivation and three species newly described.

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* Editor's Note: There is a specimen growing in the Palm House of the Royal Botanic Garden, Edinburgh.

As our seed collections begin to mature and flower it is believed that more species new to cultivation will emerge. Reports to date suggest that our seed has been widely distributed by the main subscribers and other recipients and most of our introductions seem set to become well established in cultivation.

Collecting party on one of the few tracks at high altitude in Yangbi County. Li Chuenchao in foreground, followed by Roy Lancaster and Guan Kaijun (interpreter).

Photograph by R.J. Mitchell.

The Rhododendrons collected during the Expedition

Dr. David Chamberlain

Altogether forty species were seen during the expedition (see accompanying table) and live material, either as young plants or seeds, of most of these was collected. The expedition had been planned to coincide with the peak flowering period though, inevitably, not all the species were in flower.

One of the main aims of the expedition was to study populations of the individual species of Rhododendron to detect significant variation that could be relevant to both the horticulturalist and the taxonomist. Clearly, not all the species were seen in sufficient numbers or in an adequate state to make meaningful observations. It is therefore to be hoped that plants raised from seed will ultimately augment the field studies carried out.

Significant variation in flower colour was observed in four species. Rhododendron cyanocarpum occurred in extensive and almost pure stands above 3,200 m, especially above Yangbi. The colour of newly opened flowers ranged from white to rose pink. The flowers of R. yunnanense, a plant of forest margins and clearings showed a range of shades of pink and had varying amounts and intensity of spotting, even within comparatively small populations. There were some lovely pink forms of R. decorum above Dali. In R. microphyton there was also a range of shades of pink. In none of these species however was there any obvious correlation between flower colour and other morphological differences. Therefore there is no evidence that flower colour variation in these species is of any taxonomic significance.

Two high altitude species occurring over 3,500 m, R. balfourianum and R. taliense, were not yet in flower. The leaves in R. balfourianum consistently had the plastered indumentum of the type of the species that was generally pale brownish-pink. This contrasts with the thicker, whitish, spongy indumentum of var. agganiphoides, a taxon that is not apparently represented on the Cangshan.

There is perhaps some justification in maintaining var. agganiphoides as a separate taxon.

Rhododendron taliense was seen twice during the expedition. On the summit of Longquan Peak it occurred in relatively pure stands as a dwarf shrub of up to 50 cm high amongst boulders, also as a larger shrub, generally amongst R. balfourianum. Here the leaf indumentum was consistently thick, almost lanate, and mid-brown, as in the type of the species. At Jiucaipo (above Yangbi) there was obviously much more variation, both in the shape of the leaves and in the indumentum. In this second locality the species occurred in dense thickets that were up to 2.5 m tall. Some plants could, at least superficially, be referred to R. roxieanum var. cucullatum on account of their narrower leaves and thick rust-brown indumentum. These specimens are a good match with plants collected by Rock in 1922 near Yangbi. Plants with broader leaves, the indumentum of which was yellowish-brown and more or less compacted, also grew in close proximity. These resembled at least some of the plants already in cultivation in Edinburgh. Between these two extremes there were plants that were a match with those from Longquan, as well as a whole range of intermediates. This obviously complex population could not be fully studied in the absence of flowering material. It is to be hoped that plants raised from seed will eventually help to evaluate the significance of this population. However, it seems safe to assume that the close affinity between R. roxieanum and R. taliense is confirmed. It also seems probable that the most commonly grown form of R. taliense is not typical of the species.

Rhododendron trichocladum was seen several times during the expedition, around Jiucaipo above Yangbi, at Longquan and at Huadianba. In the field there was no indication of any obvious variation within or between populations. However, comparison with herbarium material has shown that all the specimens collected during the expedition are technically referable to R. mekongense var. longipilosum on account of the size distribution and colour of the scales.

This finding was unexpected since all the material previously collected on the Cangshan had been referred to R. trichocladum. Furthermore, the type locality for R. trichocladum, described as being 'above Dali', may well have been on Longquan Peak, or at least close by. Further herbarium study suggests that R. mekongense var. longipilosum intergrades with R. trichocladum and that the difference in scale colour, a character used to distinguish the two taxa, may be an artefact due to different drying regimes. The problem has been referred to Dr. J. Cullen for further study. Hybrids were seen on four occasions. In each instance they occurred as individual plants in large mixed populations of the parent species. Probably the most interesting hybrid was R. decorum x R. arboreum subsp. delavayi which was collected at Dapingdi, above Yangbi. Only two plants of this hybrid were seen in flower, growing at 2,800 m altitude in open woodland in which both parents were frequent. In flower the specimens were conspicuous on account of the deep pink flowers that contrasted with the rich carmine flowers of R. arboreum. Closer inspection showed that the corollas were seven-lobed, a feature of the white-flowering R. decorum and that the leaves had a thin indumentum and a shape and texture intermediate of those of the parents. The herbarium specimen collected (SBEC 119) is a good match with R. agastum. This taxon was originally described from a specimen, Forrest 1920, collected at the head of the Ta-ping-pu Valley. Reference to Forrest's field notes indicated that Forrest originally considered his plant to be a hybrid between R. arboreum subsp. delavayi and a member of subsection Fortunea, the subsection to which R. decorum belongs. R. agastum may therefore be considered to be a naturally occurring hybrid of R. arboreum subsp. delavayi and R. decorum and must now be removed from Subsection Irrorata, its traditional position.

Hybrids between R. spinuliferum and R. scabrifolium (SBEC K059), between R. racemosum and R. trichocladum (SBEC 717) and between R. facetum and a species of Subsection Irrorata (SBEC 883) were also

collected.

The accompanying table lists the taxa seen with an indication of whether they were flowering, of their altitudinal ranges and of their ecology. The letter 'P' denotes the collection of young plants at the appropriate locality, while the letter 'S' denotes the collection of seed.

Dr. David Chamberlain studying rhododendrons at 4,000 m on Longquan Peak.

Photograph by R.J. Mitchell.

RHODODENDRONS COLLECTED DURING THE EXPEDITION

	Flowering	Altitude in m	Camp 1	Camp 2	Camp 3	Camp 4	Kunming	Hong Kong	Others	Ecology
x agastum (arboreum ssp. delavayi x decorum	+	2600	S							Mixed forest Open hillsides
anthosphaerum	-	3000-3200	S			+				Broad-leaved Forest
arboreum ssp. delavayi	+	2500-3000	S	+	+	+				Mixed forests Open hillsides
balfourianum	-	3700-4000	S			S				Rhododendron thickets, etc.
brachyanthum	-	2800			P					Open woodland
campylogynum	-	3500-4000			S					Open hillsides Rocks by stream
cephalanthum	+	3200				S P				Open hillside
championae	-	350						Victoria Peak		Open woodland
ciliicalyx	+	2300					Western Hills			Mixed forest
cyanocarpum	+	3200-3700	S	P	S	S				Rhododendron thicket
decorum	+	2200-3200	S	S	+	S	Western Hills Da-shao (S)		Santaipo (S)	Open woodland
dichroanthum ssp. dichroanthum	+	3100-3500			S					Open woodland Rocky ravine
edgeworthii	+	3100	S	+	S P	+				Cliffs
facetum	+	2700-3100	S			S				Broad-leaved forest
facetum x irroratum	+	3200				S				Broad-leaved forest
farrerae	-	350-1200						Victoria Peak Ma-on Shan		Open woodland
fastigiatum	+	3200-4000			S	S				Open rocky slopes
haematodes ssp. haematodes	+	3300-3750	S		S					Rhododendron thickets
heliolepis	-	3200-3750	S	S P	+					Open woodland, etc.
hongkongense	-	1200						Ma-on Shan		Open ridge
irroratum ssp. irroratum	+	2700-3200	S			S				Mixed forest

	Flowering	Altitude in m	Camp 1	Camp 2	Camp 3	Camp 4	Kunming	Hong Kong	Others	Ecology
lacteum	-	3600-3800	S	S P	S					Rhododendron thickets
maddenii ssp. crassum	-	2500-3050		S	S P				Qingbixu	Cliffs Forest margins
microphyton	+	1900-2500					Huahongdong etc.		Qingbixu	Open hillsides
moulmainense (westlandii)	-							New Territories		Castanopsis forest
neriiflorum ssp. neriiflorum	+	2500-3600	S		S				Above Dali	Mixed forest
pachypodum	+	1900-2600	S						Qingbixu Santaipo etc.	Amongst scrub
racemosum	+	2900-3300			S	S				Amongst scrub
rex ssp. fictolacteum	+	3100-3500	S	+	S	+				Mixed forest
rubiginosum	+	2900-3200	S	+		+				Mixed forest
scabrifolium ssp. spiciferum	+	2400					Dashao		Kunming to Xiaguan (S)	Open scrub
x duclouxii (scabrifolium x spinuliferum)	+	2400					Dashao			Open scrub
selense ssp. jucundum	-	3400-3700		S	S					Amongst scrub Rhododendron thickets
siderophyllum	-	2000-2400					Dashao (S)		Kunming to Xiaguan (S)	Open scrub
simiarum	+	1000						Ma-on Shan		Open woodland
simsii	+	1200-2200			+			Victoria Peak Ma-on Shan		Open hillsides
sinogrande	+	2900-3200	S P	S		+				Mixed forest
spinuliferum	+	2400					Dashao (S)			Open scrub
sulfureum	+	3000-3400	S		S					Rocky cliffs
taliense	-	3700-4000		S	S					Thickets, exposed mountain tops
taliense/roxieanum var. cucullatum	-	3700	S							Thickets
trichocladum/mekongense var. longipilosum	+	3200-3600		S	S	S				Amongst scrub
virgatum ssp. oleifolium	+	2000-2900	S	S	S					Rocky hillsides
yunnanense	+	2600-3400	S	S	S	S				Forest clearings and margins

Notes of Natural Hybrids and Intraspecific Variation of Rhododendrons in China

Peter A. Cox

One of the field studies that we wished to investigate in China was the incidence of natural hybridity: also the variation within the species themselves. Natural hybridity is known to occur throughout the distribution of rhododendrons whenever an overlap of compatible species is found. Even in western North America where there are only five botanically widely separated species, natural hybrids have been discovered between R. macrophyllum of the subsection Pontica of the subgenus Hymenanthes and R. occidentale of the section and subgenus Pentanthera. In eastern North America, it has been found that man-made clearances of forest encourage hybridisation between the azalea species of the section Pentanthera. Both here and in the azaleas of the section Tsutsutsi subgenus Anthodendron in Japan, several generations of hybrids occur in so called hybrid 'swarms', sometimes in populations now more plentiful than the species they were derived from. In many cases, it is now difficult to ascertain which are the original species. In some cases, the hybridisation has been going on for so long that some way towards speciation is taking place.

Certain species of rhododendron in southeast Asia are renowned for their variability; other groups of species can be termed aggregate species. The latter are very closely related and variable and tend to merge both morphologically and geographically. Still other groups of species intergrade into one another and yet the extremes are perfectly distinct. In all these cases, it is extremely hard to decide where natural hybridity begins and ends.

The Cangshan Range where we did most of our explorations, is a comparatively isolated ridge with several minor peaks reaching approximately 4, 000 m. This range is the furthest south and east of any

mountains attaining that height. It is evident that this comparative isolation has led to little interchange of genes within recent years and for an area containing so many distinct taxa of rhododendron, there are surprisingly few species that are not clear cut and distinct. Further north, herbarium collections tell us that much more complex populations occur and it is hoped that in the near future, we shall have opportunities to study these areas.

Bearing these factors in mind, we did not expect to find whole populations of complex probable hybrids and intermediaries and therefore the lack of such populations was not surprising. As would be expected, neighbouring species with overlapping flowering times are those most likely to produce natural hybrids and it was certainly under these conditions that hybrids were most evident. The only conspicuous hybrid we found was R. arboreum ssp. delavayi x decorum (seed collected 0119): there was probably another - R. arboreum ssp. delavayi x irroratum. These grew mixed with their parents in a cut over area. It is probable that this area, bordering small cultivated fields, has long been disturbed by man and the quantity of hybrids could at least in part, be due to man's interference with the vegetation. This group of plants was not in flower. Later, we saw one specimen in full flower with deep pink corollas with 5-6 lobes which would appear to be R. arboreum ssp. delavayi x decorum (0323). This grew in a grassy clearing near to forest (Rhododendron x agastum).

Near Kunming grow R. spinuliferum and scabrifolium var. spiciferum. Both grow together amongst other scrub and were just finishing flowering. Two plants, differing from either species were found (K 0059) which were obviously hybrids between these two species. Both grow together over a wide area and the hybrid between them has been given the name R. x duclouxii Lev by the Chinese. In the Kunming herbarium, there were no less than nine specimens of this hybrid, all showing a considerable variability. There are many more specimens in the herbarium of the Royal Botanic Garden, Edinburgh,

some of which have been placed under R. scabrifolium var. pauciflorum by Cullen. This hybrid could be so common that in places it may be undergoing the process of speciation.

Near Camp 4, Huadianba, grow R. trichocladum, deciduous with yellow flowers, and R. racemosum, evergreen with pink flowers, on fairly bare, grazed hillsides. One plant was seen (0717) with pink flowers tinged yellow which appeared to be mid-way between these two species. This apparently equals the type of R. mekongense var. rubrolineatum. On the opposite hillside south of Huadianba, there was a large plant which appeared on examination to be R. facetum x irroratum (0883). This had deep pink heavily spotted flowers and leaves with a trace of facetum type hairs (indumentum). It is a strange hybrid as these two species will rarely overlap in flowering times.

In a neighbouring valley, two separated but similar plants were seen which did not apparently fit any species (0969). One contained capsules while neither had flower buds or flowers. The large calyx would indicate R. cyanocarpum parentage and a possible guess is R. cyanocarpum x irroratum. These just overlap in elevation (seed collected).

Above Camp 3 occurs R. selense ssp. jucundum. The typical plant (0544) has leaves narrowing to the apex, with hairy stems and petioles which grows to a height of 5 m plus. Nearby also in groups grows a similar plant (0543) with wider leaves, a little earlier into growth, glabrous stems and petioles and a lower stature. Several plants of the latter were seen and appeared to be quite uniform. Is this a natural hybrid or not? As neither were flowering, further comparison was difficult and only the ultimate maturing of seedlings grown from the seed collected are likely to produce the answer, if at all.

Many of the commoner species show great intra-specific variation, both in flower and foliage. Examples are R. rubiginosum, irroratum, decorum, yunnanense, fastigiatum, microphyton, pachypodum and cyanocarpum.

Two of the commonest species of the Cangshan are

R. decorum and yunnanense. Both were plentiful around all four camps so we had ample opportunities to observe them. The former is found from about 2,300 m to 3,200 m and many were seen in flower at the last two camps. At every location we saw a great variation in leaf size, time of flowering and when in flower, in colour. One of the few apparently uniform populations occurred south of Xiaguan (and the Cangshan Range) where there were many plants with an intermediate leaf size and still unswelling flower buds at 2,300 m on May 24 (1225). Even here the odd plant had bigger leaves and a few had started to open their flowers. Rhododendron yunnanense was in full flower wherever we went and the same degrees of variability were noticeable all over. The flowers were from clear pink through pale pink to white with a varying amount of blotch. The size of flowers also varied over the whole area but it was recorded that those found at the highest altitude (3,400 m), had the smallest corollas. Rhododendron decorum showed a similar pattern of variation in flower colour, markings and size of inflorescences where in flower.

The azalea, R. microphyton is common around Kunming, on the way to Cangshan and on the east flank of Cangshan itself, occurring at low elevations. Wherever we saw this in quantity, a similar pattern of variation in flower colour was observed. This varied from very pale pink to deep pink or rose to deep magenta-purple. It does seem apparent that certain variable species are much more variable in certain areas than others from the study of herbarium specimens. Several parts of Yunnan would have to be thoroughly explored before an overall pattern could be ascertained as it is rather difficult to tell from the collections of Forrest and Rock. So many of their collections were done by trained natives and as they wrote so little on their own observations, it is left to present day explorers to make investigations into such subjects as natural hybrids and intraspecific variation.

Notes on Primulas

Peter C. Hutchison

It was from the Cangshan Range above Dali that many Chinese primulas were first described from the collections of the Abbé Delavay, George Forrest and others and we hoped to find a considerable range of species from their classic locality. Many of these early collectings have been lost to cultivation or were never introduced. In the event a number eluded us but some interesting species were found.

The most widespread primula was P. denticulata ssp. alta (Balf.f. et Forrest) W.W.Sm. et Fletcher (0149, 0525), which was found on both flanks of the Cangshan and over a wide band of altitude. Mainly a plant of the open grazed pasture, it differs from the typical P. denticulata in its greatly elongated scape, up to 40 cm or more, and in the smaller, somewhat flatter flowering head. From the garden point of view it is a somewhat ungainly plant and cannot compare with the better forms of the 'drumstick primula' in cultivation.

A further primula with a wide distribution on the range was P. sonchifolia Franch (0344, 0553, 0560 (white), 0610, 0913). It was first described from material collected in the Cangshan by Delavay in 1894 and we found it at all three of our later camps. At 3,100 m it was in fruit, at around 3,700 m it was in full flower under the rhododendron canopy and at almost 4,000 m, just under the crest ridge, the tighly imbricated resting buds were parting to reveal the violet-blue flowers inside. Here it was in open grassland, moist from the recently melted snow but in all its locations a reasonable supply of moisture seemed necessary.

An interesting feature of P. sonchifolia was the variation in farina with altitude. The fruiting plants at lowest altitudes were almost efarinose while those near the mountain crest showed considerable farina, particularly on the bud scales. Whether this is an inherent variation in the plant with altitude or a

mechanical process as it develops, possibly through weathering, should become clearer in cultivation.

A plant of the east flank, with an apparently more restricted distribution on the Cangshan, although it is found elsewhere in Yunnan, was the very fine Primula calliantha Franch. (0558). It is a clump-forming species fairly typical of Sect. Nivales and the leaves have a dense coating of yellowish-green farina beneath which also covers the flowering stem. The flowers are deep violet, fragrant, with a yellow eye and a noticeable annulus and we found it growing at around 3,700 m under a high canopy of Rhododendron and Abies delavayi. A mountain stream running under this canopy with the banks studded with both P. calliantha and P. sonchifolia (including the white form of the latter) provided the members of the expedition with an unforgettable sight.

A second member of the Sect. Petiolares was Primula taliensis Forrest (0150, 0238, 0609). It too was growing in fairly moist and shady locations at 3,000 to 3,600 m. A notable feature (and a confusing one in the field) is the marked dimorphism of the leaves. The early ones are almost spathulate in form with a broad winged petiole but these are later replaced by much larger leaves with a distinct, quite narrow petiole and a rounded, sometimes cordate blade, dentate at the margin. The plant thus has a quite different appearance at various stages in its development. A distinctive character of the plant among petiolarid primulas is the presence of septate hairs on the scape and petiole and the total absence of farina. The flowers are carried on a short scape and vary in shades of pink to bluish-pink giving it a pleasant but not striking appearance.

Surprisingly, the only primula of Sect. Candelabra that we found in flower was P. poissonii Franch. (0994) although some rosettes of leaves seen elsewhere may have belonged to other species. It was growing in typically moist situations for a Candelabra primula at the margins of pools and streams near our fourth camp, Huadianba, and the tiered stems of crimson-purple flowers were just developing.

An interesting example of specialised habitat was

seen in Primula membranifolia Franch. of Sect. Farinosae (1076). When we first saw it, it appeared as scraps of dead leaves a few centimeters across among the moss of an overhanging rock face. Closer examination revealed a tiny resting bud of incurved leaves dusted with yellow farina. In this situation, well under the overhang, it could not have received any direct rainfall and moisture, apart from atmospheric, must have come from water trickling down the rock face. At this time at the end of May it must have been waiting for the monsoon period, which was just about to commence. We later found a few plants on mossy rocks in more open situations which were already unfolding leaves and a short scape of pink flowers on an elongated corolla tube. It should be pointed out that in cultivation this frail looking plant has developed an altogether grosser appearance. P. membranifolia appears to be restricted to the Cangshan Range.

Nearby a smallish member of the Obconica Section was also growing on mossy rocks. It was possibly Primula sinolisteri Balf.f. (1077) although specific bounderies in this section are somewhat indistinct.

Towards the northern end of the range we found Primula septemloba Franch. (1051). It is a hairy plant belonging to the Sect. Cortusoides and was growing at the edge of the plain of Xiaohuadianba, under shrubs and wherever it could escape from the grazing yaks. It was not flowering at that time but has subsequently done so in cultivation with somewhat tubular magenta flowers in umbels on an elongated scape. The deeply lobed leaves were in the wild drooping at the tips, giving a somewhat 'parasol' appearance but are altogether more robust in cultivation.

Another primula which unfortunately was also not in flower was P. bella Franch. (0573). It is a tiny plant of the Sect. Minutissimae forming mats at considerable altitudes with a crust of leaves less than half a centimetre long, yellow-farinose beneath and toothed at the margin. It was growing on a sheltered rock face among rhododendrons just under Longquan Peak at 3,900 m.

May is a far from ideal month in which to collect primulas. With many trees and shrubs, particularly rhododendrons, there is a residue of last year's seed in the capsules but the primulas had entirely shed. Only in the case of P. denticulata ssp. alta and P. sonchifolia was there a little of the current year's seed and that of doubtful ripeness. The only method of introduction was therefore in most cases actually to collect plants in full growth. Transporting them at this time from camp to camp by pony and down to Xiaguan, with the subsequent staged journey over a period of ten days back to Britain (to say nothing of the hazards of phytosanitary inspection) proved too much for such inhabitants of high altitudes as P. calliantha and P. bella. However a number of species were successfully brought back to cultivation such as P. sonchifolia, septemloba, taliensis, membranifolia and poissonii.

Abies delavayi and rhododendrons amid the splendour of the cliffs above Dali.

Photograph by R.M. Mitchell.

Trilliaceae

Robert J. Mitchell

Preliminary identifications of the herbarium material from the Cangshan Range indicate a wealth of Paris and Trillium. In all, four species, three varieties and one new form were found.

The new plant - Paris polyphylla var. yunnanensis forma alba Li Hen and Mitchell - was found on two occasions. SBEC 510 and SBEC 1031. This form has a white ovary - the consistant character - and four or five bright yellow tepals which in some cases become yellow-green but is still a prominant feature of this form. It is a highly desirable plant.

The following species were found:-

Trillium tschonoskii

SBEC 612	Longquan Peak	3350 m
SBEC 863	Huadianba	2900 m

Both colonies were large and the plant varied from 15-30 cm tall, otherwise there was little variation. The flowers were white.

Despite being the most widespread of all Trillium species this plant is becoming so scarce it was granted conservation status in China in May 1981.

Paris polyphylla was the most abundant species and was found on eleven occasions usually in very large colonies. It appeared in a number of varieties:-

var. thibetica

SBEC 126, 143	Duanqing	2900 m & 3000 m
SBEC 320	Shangchang	2900 m
SBEC 604	Longquan Peak	3100 m
SBEC 872	Huadianba	2900 m
SBEC 924, 926	Wutaishan	3000 m & 3200 m

var. yunnanensis

SBEC 396	Shangchang	2700 m

var. delavayi

SBEC 050	Wuantang	2550 m

var. yunnanensis forma alba Li Hen and Mitchell (Forma novae).

SBEC 510 Longquan Peak 3350 m

SBEC 1031 Huadianba 3150 m

Paris violacea occurred in deepest shade in moist mixed woodland and in association with an abundance of ferns.

SBEC 179 Duanqing 2900 m (Plants only)

SBEC 314 Shangchang 2900 m

Paris pubescens was found on only one occasion in sparse colonies, more a scattered population in open scrub.

SBEC 662 Huadianba 2700 m

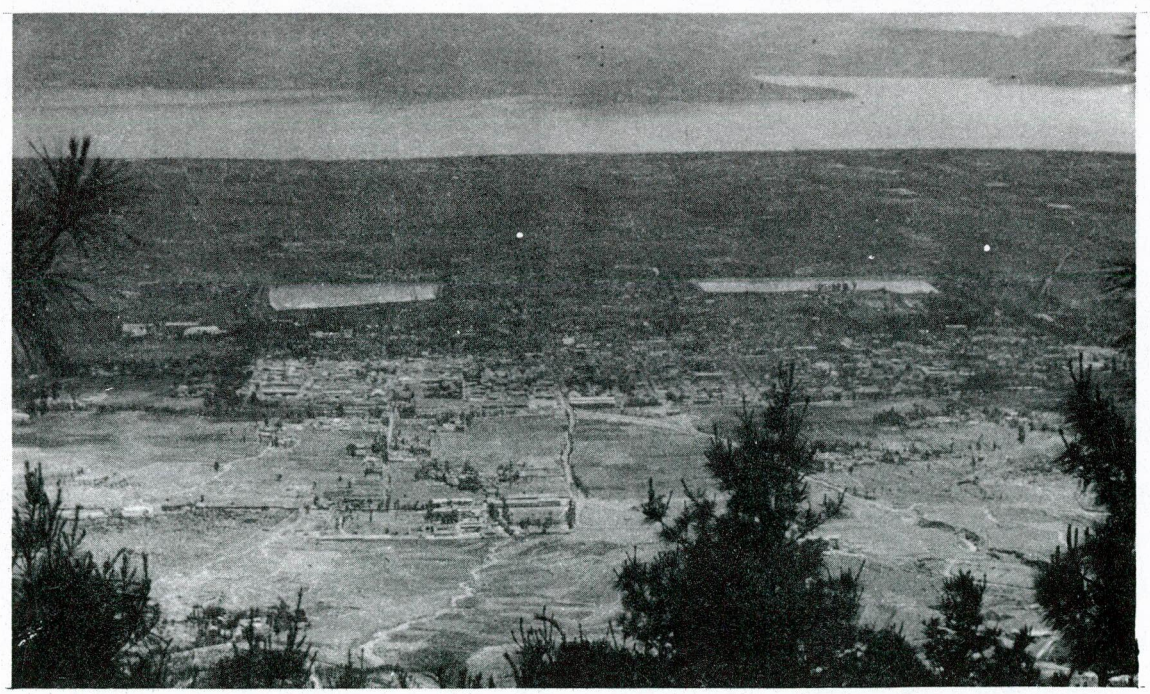
Unidentified specimens placed tentatively as Paris polyphylla varients are:-

SBEC 144 Duanqing 3000 m

SBEC 217 Xieniupingdi 2900 m

SBEC 222 Xieniupingdi 3000 m

I am in correspondence with Mrs Li Hen, Kunming Institute of Botany, Yunnan, concerning these identifications and I am most grateful for her help and guidance.



The walled city of Dali on the plain at 2,000 m with the Erh hai Lake beyond, taken from Camp 3 at 3,200 m.

Photograph by R.J. Mitchell.

ORCHIDACEAE

Plants were collected in the wild under special license granted by the Wildlife Conservation Licensing Section of the Department of the Environment in Bristol. Plants have been dispersed to research workers and papers are now being published.

I am grateful to Mr. P. Woods, Royal Botanic Garden, Edinburgh for helping with the identification of these orchids.

Calanthe

SBEC 335 Yangbi County: Shangchang, 2800 m. 7.v.81
In dense forest growing in leaf litter in association with ferns.
Plants and seeds collected.

Calanthe

SBEC 902 Dali County: Huadianba, 2950 m. 19.v.81
In broad leaved forest growing in leaf litter.
Plant and seed collected (Edinburgh Acc. No. 812639).

Cephalanthera longifolia

SBEC 746 Dali County: Xiaohuadianba, 2950 m. 18.v.81
Ground orchid growing in thickets.
Herbarium specimen only.

Coelogyne corymbosa

SBEC 113 Yangbi County: Dapingdi, 3000 m. 3.v.81
Epiphyte on trees at edge of forest.
Herbarium and plant collected.

SBEC 216 Yangbi County: Xieniupingdi, 2700 m. 5.v.81
Epiphyte growing in dense forest.
Plant collected (Edinburgh Acc. No. 812812).

SBEC 624 Dali County: Longquan Peak, 3000 m. 15.v.81
Growing among moss and grasses on a rocky outcrop under canopy of Pinus yunnanensis.
Herbarium and plant collected.

Cypripedium

SBEC 1049 Dali County: Huadianba, 3150 m. 21.v.81
Ground orchid growing in thicket.
Herbarium specimen collected.

Cypripedium flavum

SBEC 663 Dali County: Huadianba, 2700 m. 17.v.81
Ground orchid growing in open forest with Magnolia wilsonii f. taliensis (655),

Paeonia (684) and Enkianthus deflexus (681).
Herbarium specimen collected.

Cypripedium margaritaceum

SBEC 623 Dali County: Longquan Peak, 3000 m. 15.v.81
Ground orchid growing in open ground in wooded area at base of marble rock.
Herbarium specimen only.

Dendrobium

SBEC 67 Yangbi County: Dapingdi, 2700 m. 3.v.81
Epiphyte on trees in dense forest.
Plant collected (Edinburgh Acc. No. 812805).

Dendrobium aff candidum

SBEC 174 Yangbi County: Sanchaohe, 2200 m. 4.v.81
Epiphyte on trees in forest.
Herbarium and plant collected (Edinburgh Acc. No. 812807).

Gastrochilus

SBEC 110 Yangbi County: Dapingdi, 3000 m. 3.v.81
Epiphyte on Rhododendron delavayi.
Herbarium and plant collected (Edinburgh Acc. No. 812806).

Gastrochilus cf. pseudodistichum

SBEC 1145 Dali County: Qingbixu, 2400 m. 23.v.81
Epiphyte on vertical mossy rocks with Primula membranifolia (1076) and Begonia taliensis (1150).
Collected as Aeschynanthus.
Plant collected (Edinburgh Acc. No. 812809).

Goodyera repens

SBEC 200 Yangbi County: Xieniupingdi, 2850 m. 5.v.81
Ground orchid in broad leaved forest.
Herbarium and plant collected (Edinburgh Acc. No. 812791).

Holcoglossum

SBEC 246 Yangbi County: Duanqing, 3200 m. 5.v.81
Growing in forest. Epiphyte on tree trunk.
Herbarium specimen collected.

SBEC 380 Yangbi County: Shangchang, 2700 m. 9.v.81
Epiphyte on Alnus in light forest.
Herbarium and plant collected (Edinburgh Acc. No. 812808).

Pleione bulbocodioides

SBEC 205 Yangbi County: Xieniupingdi, 3100 m. 5.v.81
Epiphyte in moss and lichens on steep rock face under Rhododendron edgeworthii (207)

and R. sulfureum (210), with Pleione forrestii (206) nearby.
Herbarium, plants and seed collected (Edinburgh Acc. No. 812467).

Pleione forrestii

SBEC 108 Yangbi County: Dapingdi, 2700 m. 3.v.81
Epiphyte on trees in dense forest.
Plants collected (Edinburgh Acc. No. 812449).

SBEC 178 Yangbi County: Duanqing, 3100 m. 4.v.81
Epiphyte on moss covered rocks.
Plants collected.

SBEC 206 Yangbi County: Xieniupingdi, 3100 m. 5.v.81
Epiphyte in moss and lichens on steep rock face (Details as SBEC 205).
Herbarium and plants collected (Edinburgh Acc. No. 812468).

Pleione yunnanensis

SBEC 66 Yangbi County: Dapingdi, 2700 m. 3.v.81
Small colonies on light woodland among grass under Lyonia ovalifolia.
Herbarium and plants collected (Edinburgh Acc. No. 812425).

Indet specimens

SBEC 362 Yangbi County: Juicaipo, 3400 m. 8.v.81
Growing on an exposed ridge.
Seed only collected.

SBEC 397 Yangbi County: Shangchang, 2600 m. 9.v.81
Saprophytic orchid growing in dense thicket.
Herbarium specimen collected.

SBEC 792 Dali County: Xiaohuadianba, 3100 m. 15.v.81
Saprophytic orchid growing among Rhododendrons on open hillside.
Herbarium specimen collected.

Hypericum collected in Yunnan, 1981

Special emphasis was placed on collecting Hypericum specimens for Norman Robson of the British Museum. His work on Hypericum outlined the need to make further collections from this area which is important in the geographical sense. It so proved to be with three new species and two new subspecies from the Kunming/Cangshan collections.

Determinations were made by Norman Robson to whom acknowledgement is herewith gratefully recorded. Collection details are given overleaf.

Descriptions of the new plants will be published in Bulletin British Museum (Natural History) in the Botany Series: Studies in the Genus Hypericum L. (Guttiferae) by Norman Robson and will be available in 1984.

Professor Feng and Roy Lancaster with collection of *Hypericum* specimens.

Photograph by R.J. Mitchell.

Hypericum acmosepalum

SBEC 127	Yangbi Co.	Duanqing	3000m	Clearing in forest	4.v.81
SBEC 422	Yangbi Co.	Shangchang	2700m	Forest glade	9.v.81
SBEC 423	Yangbi Co.	Shangchang	2600m	Forest glade	9.v.81
SBEC 551	Dali Co.	Longquan Peak	3200m	Open hillside	14.v.81
SBEC 1064	Dali Co.	Xiaguan Hot Springs	1850m	Hillside	23.v.81
SBEC K52	Kunming	Hua Hong Dong	2400m	Dry hillside	26.iv.81

Hypericum beanii

SBEC K47	Kunming	Hua Hong Dong	2400m	Dry hillside	26.iv.81
SBEC K67	Kunming	Dashao	2400m	Dry hillside	26.iv.81
SBEC K151	74 km west of Kunming		2000m	Roadside bank	27.v.81

Hypericum bellum subsp. nov. No. 1

SBEC 366a	Yangbi Co.	Jiucaipo	3400m	Exposed hillside	8.v.81
SBEC 421	Yangbi Co.	Shangchang	2700m	Forest glade	9.v.81
SBEC 424	Yangbi Co.	Shangchang	2600m	Forest glade	9.v.81
SBEC 502	Dali Co.	Above Dali	3000m	Hillside scrub	12.v.81
SBEC 550	Dali Co.	Longquan Peak	3400m	Open hillside	13.v.81
SBEC 693	Dali Co.	Huadianba	2700m	Hillside	17.v.81
SBEC 699	Dali Co.	Huadianba	2700m	Hillside	17.v.81

Hypericum sp. nov. No. 1

SBEC 49	Yangbi Co.	Wuantang	2550m	Dry hillside	2.v.81
SBEC 283	Yangbi Co.	Zaimen	2400m	Dry hillside	6.v.81
SBEC 1073	Dali Co.	Qingbixu	2500m	Rocky bank	23.v.81
SBEC 1081	Dali Co.	Qingbixu	2300m	Rocky hillside	23.v.81
SBEC 1198	Weishan Co.	Santaipo	2350m	Roadside bank	24.v.81
SBEC K118	Kunming	Tai Hua Temple	2300m	Pine woodland	28.iv.81

Hypericum forrestii

SBEC 472	Dali Co.	Above Dali	2150m	Dry hillside	12.v.81
SBEC 1143	Dali Co.	Qingbixu	2100m	In graveyard	23.v.81
SBEC 1180	Weishan Co.	Santaipo	2450m	Roadside	24.v.81

Hypericum henryi subspecies henryi

SBEC 704	Dali Co.	Huadianba	2400m	Hillside	17.v.81
SBEC 1199	Weishan Co.	Santaipo	2350m	Roadside bank	24.v.81
SBEC K37	Kunming	Hua Hong Dong	2000m	Dry hillside	26.iv.81
SBEC K106	Kunming	Western Hills (Dragon Gate Temple)	2200m	Open pine forest	28.iv.81
SBEC K151a	74 km west of Kunming		2000m	Roadside bank	27.v.81

Hypericum henryi subsp. nov. No. 2

SBEC 2	Dali Co.	Erh Hai Park Xiaguan	1956m	Dry hillside	1.v.81
SBEC 43	Yangbi Co.	Mahungou	2350m	Dry hillside	2.v.81
SBEC 264	Yangbi Co.	Mofanggou	2400m	Dry hillside	6.v.81
SBEC 280	Yangbi Co.	Zaimen	2400m	Dry hillside	6.v.81
SBEC 366	Yangbi Co.	Jiucaipo	3400m	Exposed hillside	8.v.81
SBEC 1166	Weishan Co.	Santaipo	2350m	Roadside	24.v.81

Hypericum hookerianum

SBEC 10	Dali Co.	Erh Hai Park Xiaguan	1950m	Dry hillside	1.v.81
SBEC 469	Yangbi Co.	Ziyang	2560m	Dry hillside	10.v.81

Hypericum japonicum

SBEC 1088	Dali Co.	Qingbixu	2200m	Rocky hillside	23.v.81

Hypericum sp. nov. No. 2

SBEC K149	260 km west of Kunming		2400m	Roadside	27.v.81

Hypericum sp. nov. No. 3

SBEC 34	Yangbi Co.	Xieshanhe	1800m	Rock crevice	2.v.81
SBEC 1096	Dali Co.	Qingbixu	2000m	Bank between fields	23.v.81
SBEC K1	Kunming	Hua Hong Dong	2000m	Dry hillside	26.iv.81
SBEC K2	Kunming	Hua Hong Dong	2000m	Dry hillside	26.iv.81
SBEC K36	Kunming	Hua Hong Dong	2000m	Dry hillside	26.iv.81
SBEC K39	Kunming	Hua Hong Dong	2000m	Dry hillside	26.iv.81

Hypericum wightianum

SBEC 481	Dali Co.	Above Dali	2150m	Wet places	12.v.81
SBEC 1091	Dali Co.	Qingbixu	2100m	Streamside	23.v.81

Indet.

SBEC 964	Dali Co.	Wutaishan	3200m	Bank above river	20.v.81
SBEC 1141	Dali Co.	Qingbixu	2500m	Rocky hillside	23.v.81

South China Institute of Botany
Academic Sinica
Guangzhou

The Institute was founded in 1928 as a department of Sun Yat-sen University and was transferred to the Academy of Sciences in 1954.

The present staff at the Institute is 500 which includes 260 research workers. There are 8 research departments:-

1. Taxonomy

The herbarium contains 600,000 specimens and the staff are actively assisting with the Flora of China.

Already complete are:

Hainan Island Flora 4 volumes
Illustrated Flora of Medicinal Herbs 3 volumes
Flora of Guangzhou

The Vegetation of South China is being compiled by the members of the Institute, in particular the families Leguminosae, Primulaceae, Sapindaceae, Fagaceae, Pteridophyta, Cyperaceae and Rosaceae.

2. Geobotany and Ecology

Studies on the Ecosystem of the Tropical Rainforest round the coast continues, as does the 50 year research project on soil fertility. Pollution in cities related to carbon monoxide and sulphur dioxide relates to pollution resistent tree species and planting programmes while survey work is producing vegetation data useful in providing cropping programmes.

3. Plant Physiology

With the lowest temperatures of 2-3°C, research in cold resistance in local crops is an important part of the research, particularly when new crops are being tested. Hevea has been attempted but has not successfully established.

Studies on the storage life of Citrus, Banana and Litchi continues. Deep freezing of Litchi to -18°C allows storage for 1-2 years.

4. Phytochemistry

Research centres around the study of polyphenol oxidase and polyphenol inhibitors, Malic acid and Abscorbic acid being an integral part of the programme.

Photosynthesis and C_4 characteristics in tropical grasses are also being studied.

5. Plant Genetics

Work continues on improved rice varieties (subspecies indica) using colchicine and anther culture - the work of Sunderland and Cocking being well known to them - and the fusion of protoplasts.

In developing hybrid rice, sterile male lines developed. With restored fertility underlying reasons for this are being sought.

6. Plant Morphology

The main work seems to be centred on pollen morphology and in their hunt for oil.

7. Plant Introduction

A seed list is produced by the Botanic Garden situated close at hand and the aim of the department is to introduce species which may prove to be of economic value in the province.

8. Landscape Gardening

The last two departments are centred on the Botanic Garden nearby. This covers 300 hectares and contains 3,500 taxa. It was designed and landscaped by Professor Ch'en commencing in 1959 and contains an impressive collection of Bamboo (50 species), Araucaria (40 species), Palms, Taxodium, Metasequoia and Ginkgo. Potted collections include 600 medicinal plants, orchids, begonias and ferns growing in lathe houses.

The arboretum at Ding Hu Shan some 86 km from the Institute we did not see but were told that it dates from about 1956. With Royal Society helpful advice (Professor Heslop Harrison) and development under UNESCO programme

"Ecosystems of Tropical Rainforests" its area is about 1,100 hectares.

Further Accounts of the South China Institute can be found in the following reports

Scientific Visits to China under arrangements between the Academia Sinica and the Royal Society. Royal Delegation led by Professor J.L. Harley, F.R.S. 1975. Report CH/2(75)A Parts 1-2.

Report on Visits to China by N. Sunderland and E.C. Cocking 1978.

Report of a Visit to China by P.S. Green and J.B. Simmons, Kew 1978.

Botany in China: Report of the Botanical Society of America Delegation to the People's Republic of China 1978. U.S./China Relations Report 6.

Acknowledgements

Sincere thanks are here recorded to the Royal Society, the Chinese Academy of Sciences and to Professor Wu Chen-yih of the Kunming Institute of Botany for arranging this visit. To Sir John Addis, the late Sir John Keswick, the Great Britain China Centre and the Asian Desk of the Foreign Office we render thanks for their considerable assistance in the early stages of planning the expedition.

We are grateful to the Leaders and Elders of the Dali Bai Autonomous Prefecture who granted permission for the expedition to visit the Cangshan Range to undertake joint botanical work, and to the Leaders and Elders of Yangbi County and Dali County who welcomed us so freely and gave all manner of assistance during our stay. We thank the Director of the Huadianba medicinal farm for permitting the expedition to use the farm as a base for one week towards the end of the visit.

To our colleagues from the Institute and the Forestry Officers, Guides, Guards and Cooks and not forgetting the Doctor seconded to our party from the Regional Government, we extend our warmest greetings and sincere thanks for an excellent organisation of camp routine.

Travel arrangements were undertaken by Turnbull-Gibson using flights by British Caledonian, Cathay Pacific, who could not have been more helpful, especially Mr. Chris MacKenzie for permitting the plants to be brought back as cabin luggage, and C.A.A.C. (The Chinese Airline) whose bookings were arranged by the Academy of Sciences. We record our thanks. Mrs. Carolin Clapperton acted as our official representative in Hong Kong and helped to organise the supply of additional tents and much appreciated social events and personal contacts.

While in Hong Kong we received every possible assistance in seeing the vegetation, especially the Rhododendrons, from Lady Noel Maclehose who personally conducted our party round the flora of Victoria Peak. On another occasion, she arranged a visit to Kadoorie Garden and then on to Fanling Lodge for lunch. S.P. Lau took us up Ma On Shan to see Rhododendron hongkongense and to Wu

Kau Tang to see Rhododendron moulmainense (westlandii). He was also responsible for granting the phytosanitary certificate from the Department of Agriculture.

The five baskets of living plants were of the utmost importance so every precaution was taken to ensure their safe passage. The C.A.A.C. agreed to have them as cabin luggage and while in Guangzhou a phone call to Mrs. Carolin Clapperton and then to Lady Maclehose helped to ease our way through Hong Kong Customs. It was Lady Maclehose and Mr. Chris MacKenzie who agreed that the plants should travel as cabin luggage to Gatwick. During the flight water was sprayed on the plants to keep them moist. To all those in Hong Kong, including Iain Orr and Mary Carson of Government House, we convey our sincere thanks.

We record our gratitude to our sponsors; without them we could not have participated at all.

Tony Schilling was our financial assistant and, due to his illness could not participate in the expedition. Peter Hutchison took over this responsibility. Peter's financial wizardy in converting Sterling into H.K. Dollars into Chinese Yuans and Rimbibis and back again, gained my great admiration. To both I extend my sincere gratitude for assisting in suggestions for fund raising to accounting the transactions.

Finally, I would like to thank my colleagues British and Chinese, who so quickly established themselves into a good working team that my function as co-leader with Professor Feng Guomei was made so much the easier.

"We came as strangers but we depart as friends". How true these words are, and it is our hope that we will see our Chinese colleagues here in Britain soon.

We shall continue to liaise over the subsequent taxonomic investigations and share information on plants. This, after all, is what international botanical co-operation is all about.

R.J. Mitchell.

APPENDICES

Appendix 1 Sponsors List

Royal Society
Stanley Smith Horticultural Trust
Percy Sladen Memorial Fund
Royal Horticultural Society
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- New York Chapter American Rhododendron Society
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Rhododendron Species Foundation
- Mr. Edward B. Dunn
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Rhododendron Species Foundation (contd.)

Lady Anne Kerr McDonald
Mrs. Glen Kerry Trimble
Mrs. N. Stewart Rogers

Portland Chapter American Rhododendron Society
Gray's Harbour Chapter American Rhododendron Society
Vancouver Island Rock and Alpine Society

Support and Approval

Royal Geographical Society

Preparing for the day's outing at Huadianba, Dali County.

Photograph by R.J. Mitchell.

LIST OF SEEDS COLLECTED

SBEC NO.	NAME	LOCALITY	HABITAT	ALTITUDE	DATE
0043	Hypericum henryi ssp. uraloides	Mohungou	Dry hillside	2350	02 v 1981
0048	Myrsine semiserrata	Wuantang	In shady gully	2550	02 v 1981
0049	Hypericum sp. nov. No. 1	Wuantang	Dry hillside	2550	02 v 1981
0054	Astilbe rivularis	Wuantang	Shady ravine	2550	02 v 1981
0060	Rhododendron yunnanense	Dapingdi	In forest	2700	03 v 1981
0064	Rhododendron irroratum	Dapingdi	In forest	2700	03 v 1981
0065	Boschniaka himalaica	Dapingdi	Rhododendron forest	2700	03 v 1981
0071	Piptanthus nepalensis	Dapingdi	Forest clearing	2800	03 v 1981
0079	Schima yunnanensis	Dapingdi	In forest	2700	03 v 1981
0083	Gaultheria griffithiana	Dapingdi	Edge of forest	2800	03 v 1981
0092	Tsuga dumosa	Dapingdi	Edge of forest	3000	03 v 1981
0100A	Rhododendron irroratum	Dapingdi	In forest	2800	03 v 1981
0100B	Rhododendron irroratum	Dapingdi	In forest	3000	03 v 1981
0104	Rhododendron sinogrande	Dapingdi	In forest	3000	03 v 1981
0109	Pinus yunnanensis	Dapingdi	Open hillside	2650	03 v 1981
0115	Rhododendron pachypodum	Dapingdi	In forest	2700	03 v 1981
0116	Rhododendron decorum	Dapingdi	In forest	2650	03 v 1981
0117	Craibiodendron yunnanense	Dapingdi	In forest	2700	03 v 1981
0118	Gentiana	Dapingdi	Open hillside	3000	03 v 1981
0119	Rhododendron x agastum	Dapingdi	Disturbed clearing	2700	03 v 1981
0120A	Rhododendron delavayi	Dapingdi	Exposed ridge	2500	02 v 1981
0120B	Rhododendron delavayi	Dapingdi	Open hillside	3020	03 v 1981
0121	Rhododendron rubiginosum	Dapingdi	Forest edge	2900	03 v 1981
0127	Hypericum acmosepalum	Duanqing	Open ground	3000	04 v 1981
0149	Primula denticulata ssp. alta	Duanqing	Open hillside	3000	04 v 1981
0160	Rhododendron rex ssp. fictolacteum	Duanqing	In forest	3200	04 v 1981
0162	Rhododendron cyanocarpum	Duanqing	In forest	3200	04 v 1981
0163	Rhododendron anthosphaerum	Duanqing	In forest	3000	04 v 1981
0172	Rhododendron neriiflorum	Duanqing	In forest	3100	04 v 1981
0173	Buddleia	Duanqing	In forest	3100	04 v 1981
0180	Astilbe	Duanqing	In forest	2800	04 v 1981
0181	Rhododendron decorum	Duanqing	In forest	2800	04 v 1981
0182	Rhododendron sinogrande	Duanqing	In forest	2900	04 v 1981
0183	Rhododendron facetum	Duanqing	In forest	3000	04 v 1981
0184	Rhododendron neriiflorum	Duanqing	In forest	3000	04 v 1981
0185	Epilobium	Duanqing	On rocks	3100	04 v 1981
0186	Philadelphus delavayi	Dapingdi	Hillside scrub	2550	02 v 1981
0193A	Deutzia calycosa longisepala	Xieniupingdi	Edge of forest	2850	05 v 1981
0193B	Deutzia	Xieniupingdi	Edge of forest	3000	05 v 1981
0205	Pleione bulbocodioides	Xieniupingdi	On exposed rocks	3100	05 v 1981
0207	Rhododendron edgeworthii	Xieniupingdi	On exposed rocks	3100	05 v 1981
0208	Gentiana maelchanensis	Xieniupingdi	In forest	2800	05 v 1981
0210	Rhododendron sulfureum	Xieniupingdi	On exposed rocks	3100	05 v 1981
0212	Aster albescens	Xieniupingdi	On exposed rocks	3100	05 v 1981
0218	Rhododendron yunnanense (White form)	Xieniupingdi	In forest	2800	05 v 1981
0227	Taxus yunnanensis	Xieniupingdi	In virgin forest	3000	05 v 1981
0235	Rhododendron lacteum	Dashichang	In thicket	3600	05 v 1981
0237	Primula	Dashichang	On block scree	3600	05 v 1981
0240	Rhododendron heliolepis var. brevistylum	Dashichang	In thicket	3400	05 v 1981
0244	Rhododendron cyanocarpum	Dashichang	Exposed hillside	3600	05 v 1981
0249	Rhododendron sulfureum	Dashichang	Edge of rock	3400	05 v 1981
0253	Sedum	Dashichang	On scree	3600	05 v 1981
0256	Gynura	Xieniupingdi	In forest	2700	05 v 1981
0257	Rhododendron facetum	Xieniupingdi	In bamboo thicket	3100	05 v 1981
0258	Rhododendron heliolepis	Dashichang	Edge of scree	3600	05 v 1981
0259	Lyonia ovalifolia	Dashichang	In bamboo thicket	3400	05 v 1981

SBEC NO.	NAME	LOCALITY	HABITAT	ALTITUDE	DATE
0260	Rhododendron cyanocarpum	Dashichang	Edge of scree	3600	05 v 1981
0261	Prinsepia utilis	Mofanggou	Dry hillside	2400	06 v 1981
0264	Hypericum henryi ssp. nov. No. 2	Mofanggou	Dry hillside	2400	06 v 1981
0265	Rhododendron virgatum ssp. oleifolium	Mofanggou	Dry hillside	2400	06 v 1981
0273	Deutzia calycosa var. longisepala	Shangchang	On hillside	2400	06 v 1981
0280	Hypericum henryi ssp. uraloides	Zhaimen	Dry hillside	2400	06 v 1981
0295	Rhododendron maddenii ssp. crassum	Shangchang	Edge of forest	3050	07 v 1981
0319	Tupistra aurantiaca	Shangchang	In forest	2700	07 v 1981
0325	Daphne papyracea	Shangchang	Forest glade	2800	07 v 1981
0327	Hedera nepalensis var. sinensis	Shangchang	In forest	2700	07 v 1981
0331	Rhododendron yunnanense	Shangchang	Edge of forest	2800	07 v 1981
0332A	Pieris formosa	Shangchang	Edge of forest	3000	07 v 1981
0332B	Pieris formosa	Shangchang	Edge of forest	2700	07 v 1981
0333	Philadelphus	Shangchang	In forest	2900	07 v 1981
0334	Rhododendron sino-grande	Shangchang	In forest	2800	07 v 1981
0335	Calanthe	Shangchang	In forest	2800	07 v 1981
0336	Rodgersia	Shangchang	Edge of forest	2800	07 v 1981
0345	Rhododendron lacteum	Jiucaipo	Exposed ridge	3700	08 v 1981
0350	Rhododendron taliense/roxieanum cucullatum	Jiucaipo	Exposed slopes	3830	08 v 1981
0351	Rhododendron trichocladum	Jiucaipo	Exposed S.W. slopes	3400	08 v 1981
0360	Buddleia	Shangchang	Forest edge	2700	08 v 1981
0361	Rhododendron cyanocarpum	Jiucaipo	Exposed ridge	3400	08 v 1981
0362	Orchid (terrestrial)	Jiucaipo	Exposed ridge	3500	08 v 1981
0363	Rhododendron heliolepis	Jiucaipo	Exposed ridge	3500	08 v 1981
0364	Rhododendron haematodes	Jiucaipo	Beneath R. lacteum	3500	08 v 1981
0365	Rhododendron selense ssp. jucundum	Jiucaipo	Exposed ridge	3500	08 v 1981
0366	Hypericum henryi ssp. nov. No. 2	Jiucaipo	Exposed hillside	3400	08 v 1981
0372	Herbaceous plant	Jiucaipo	Exposed ridge	3800	08 v 1981
0380	Holcoglossum	Shangchang	Epiphyte on R. delavayi - Edge of forest	2700	09 v 1981
0383	Acer flabellatum var. yunnanense	Shangchang	Forest edge	2700	09 v 1981
0402	Hydrangea scandens ssp. chinensis	Shangchang	In forest	2600	09 v 1981
0411	Spiraea japonica var. acuminata	Shangchang	Forest glade	2600	09 v 1981
0417	Deutzia calycosa	Shangchang	In forest	2700	09 v 1981
0421	Hypericum bellum ssp. nov. No. 1	Shangchang	Forest glade	2700	09 v 1981
0422	Hypericum acmosepalum	Shangchang	Forest glade	2700	09 v 1981
0435	Deutzia discolor	Shangchang	Forest glade	2700	09 v 1981
0436	Deutzia discolor	Shangchang	Forest glade	2700	09 v 1981
0437	Deutzia discolor	Shangchang	Forest glade	2700	09 v 1981
0438	Deutzia discolor	Shangchang	Forest glade	2700	09 v 1981
0439	Rhododendron decorum	Shangchang	Beside stream in gully	2600	09 v 1981
0466	Acer davidii	Ziyang	Dry hillside	2560	10 v 1981
0468A	Indigofera balfouriana	Ziyang	Dry hillside	2560	10 v 1981
0468B	Indigofera balfouriana	Ziyang	Dry hillside	2530	10 v 1981
0472	Hypericum forrestii	Dali	Dry hillside	2150	12 v 1981
0489	Erigeron breviscapus	Dali	Subalpine pasture	2500	12 v 1981
0502	Hypericum bellum ssp. nov. No. 1	Dali	Subalpine pasture	3000	12 v 1981
0504	Rhododendron mekongense var. longipilosum	Longquan Peak	Hillside below peak	3550	13 v 1981
0505	Abies delavayi	Longquan Peak	Hillside below peak	3600	13 v 1981
0507	Rhododendron neriiflorum	Longquan Peak	Hillside below peak	3450	13 v 1981
0508	Rhododendron racemosum	Longquan Peak	Hillside below peak	3500	13 v 1981
0519	Rhododendron campylogynum	Longquan Peak	Hillside below peak	3600	13 v 1981
0529	Deutzia	Longquan Peak	Hillside below peak	3650	13 v 1981
0532	Rhododendron sulfureum	Longquan Peak	Hillside below peak	3600	13 v 1981
0533	Rhododendron fastigiatum	Longquan Peak	Hillside below peak	3500	13 v 1981
0534	Rhododendron fictolacteum	Longquan Peak	Hillside below peak	3600	13 v 1981
0535	Rhododendron cyanocarpum	Longquan Peak	Hillside below peak	3600	13 v 1981
0543	Rhododendron selense	Longquan Peak	Hillside below peak	3500	13 v 1981
0544	Rhododendron selense ssp. jucundum	Longquan Peak	Hillside below peak	3600	13 v 1981

SBEC NO.	NAME	LOCALITY	HABITAT	ALTITUDE	DATE
0545	Rhododendron dichroanthum	Longquan Peak	Hillside below peak	3500	13 v 1981
0546	Rhododendron taliense	Longquan Peak	In ravine	3600	13 v 1981
0547	Pieris formosa	Longquan Peak	Hillside below peak	3300	13 v 1981
0548	Lyonia	Longquan Peak	Hillside below peak	3300	13 v 1981
0549	Clethra delavayi	Longquan Peak	Hillside below peak	3300	13 v 1981
0550	Hypericum bellum ssp. nov. No. 1	Longquan Peak	Hillside below peak	3400	13 v 1981
0551	Hypericum acmosepalum	Longquan Peak	Hillside below peak	3200	13 v 1981
0555	Rhododendron taliense	Longquan Peak	Amongst rocks	3850	14 v 1981
0556	Rhododendron fastigiatum	Longquan Peak	Amongst rocks	3850	14 v 1981
0557	Rhododendron fastigiatum	Longquan Peak	Hillside	3850	14 v 1981
0558	Primula calliantha	Longquan Peak	Moist slopes	3850	14 v 1981
0561	Rhododendron haematodes	Longquan Peak	Craggy hillside	3900	14 v 1981
0572	Androsace	Longquan Peak	Open slopes	3700	14 v 1981
0574	Primula	Longquan Peak	Open slopes	3700	14 v 1981
0581	Rhododendron taliense	Longquan Peak	Slopes below peak	3800	14 v 1981
0582	Rhododendron lacteum	Longquan Peak	Slopes below peak	3800	14 v 1981
0583	Rhododendron balfourianum	Longquan Peak	Slopes below peak	3700	14 v 1981
0585	Rhododendron haematodes	Longquan Peak	Slopes below peak	3800	14 v 1981
0586	Rhododendron haematodes	Longquan Peak	Slopes below peak	3700	14 v 1981
0587	Rhododendron campylogynum	Longquan Peak	Slopes below peak	3650	14 v 1981
0588	Sedum	Longquan Peak	Slopes below peak	3850	14 v 1981
0595	Ancylostemon convexus	Longquan Peak	Shady ravine	3100	15 v 1981
0601	Rhododendron dichroanthum	Longquan Peak	Shady ravine	3100	15 v 1981
0607	Rhododendron edgeworthii	Longquan Peak	Shady ravine	3100	15 v 1981
0621	Rhododendron virgatum ssp. oleifolium	Longquan Peak	Ridge below peak	3100	15 v 1981
0640	Rhododendron maddenii ssp. crassum	Longquan Peak	Rock face	3000	15 v 1981
0643	Hydrangea	Longquan Peak	Shady ravine	3100	15 v 1981
0644	Deutzia	Longquan Peak	Shady ravine	3100	15 v 1981
0645	Pyrola	Longquan Peak	Ridge below peak	3000	15 v 1981
0646	Ormosia emarginata	Hong Kong	New territories - Wu Kau Tang	-	23 iv 1981
0647	Euphorbia prolifera	Dali	Pasture above city	2200	15 v 1981
0656	Lonicera setifera	Huadianba	Hillside	2700	17 v 1981
0681	Enkianthus deflexus	Huadianba	Hillside	2700	17 v 1981
0693	Hypericum bellum ssp. nov. No. 1	Huadianba	Hillside	2700	17 v 1981
0713	Gaultheria forrestii	Huadianba	Hillside	2700	17 v 1981
0714	Cotoneaster	Huadianba	Pasture	2900	17 v 1981
0717	Rhododendron racemosum x mekongense	Xiaohuadianba	Hillside	3100	18 v 1981
0730	Litsea cubeba	Xiaohuadianba	Hillside	2950	18 v 1981
0735	Berberis	Xiaohuadianba	Hillside	3100	18 v 1981
0751	Rhododendron cephalanthum	Xiaohuadianba	Hillside	3100	18 v 1981
0753	Rhododendron fastigiatum	Xiaohuadianba	Hillside	3100	18 v 1981
0758	Syringa yunnanensis	Xiaohuadianba	Hillside	2950	18 v 1981
0774	Incarvillea mairei	Xiaohuadianba	Hillside	3000	18 v 1981
0782	Cotoneaster	Xiaohuadianba	Hillside	3000	18 v 1981
0803	Philadelphus	Xiaohuadianba	Hillside	2950	18 v 1981
0804	Rhododendron fastigiatum	Xiaohuadianba	Hillside	3100	18 v 1981
0805	Rhododendron trichocladum	Xiaohuadianba	Hillside	3100	18 v 1981
0806	Rhododendron racemosum	Xiaohuadianba	Hillside	3050	18 v 1981
0814	Enkianthus deflexus	Huadianba	In side valley	2900	19 v 1981
0840	Rhododendron anthosphaerum	Huadianba	In side valley	3000	19 v 1981
0848	Hydrangea heteromalla	Huadianba	In side valley	2900	19 v 1981
0853	Lithocarpus	Huadianba	In thicket	2900	19 v 1981
0860	Clethra delavayi	Huadianba	In thicket	2900	19 v 1981
0861	Alnus ferdinandi-coburgii	Huadianba	By stream	2900	19 v 1981
0883	Rhododendron irroratum x facetum	Huadianba	In forest	2900	19 v 1981
0890	Rhododendron facetum	Huadianba	In forest	2900	19 v 1981
0898	Rhododendron irroratum	Huadianba	In forest	2900	19 v 1981

SBEC NO.	NAME	LOCALITY	HABITAT	ALTITUDE	DATE
0899	Pyrola	Huadianba	In forest	2900	19 v 1981
0900	Ilex yunnanensis	Huadianba	In forest	3000	19 v 1981
0902	Calanthe	Huadianba	In forest	2950	19 v 1981
0908	Acer caudatum var. georgei	Wutaishan	Streamside	3100	20 v 1981
0929	Piptanthus nepalensis	Wutaishan	Streamside	3000	20 v 1981
0969	Rhododendron	Wutaishan	Bank above stream	3250	20 v 1981
0970	Sorbus	Wutaishan	Bank above stream	3300	20 v 1981
0971	Rhododendron cyanocarpum (Pink form)	Wutaishan	In bamboo thicket	3350	20 v 1981
0972	Piptanthus nepalensis	Wutaishan	Above stream	3250	20 v 1981
1007	Corylopsis sinensis var. calvescens	Huadianba	Streamside	2850	21 v 1981
1014	Rhododendron facetum	Huadianba	In thicket	2850	21 v 1981
1038	Juniperus squamata	Huadianba	Amongst rocks	3250	21 v 1981
1043	Pinus yunnanensis	Huadianba	Hillside	3200	21 v 1981
1051	Primula septemloba	Huadianba	In gully	3150	21 v 1981
1057	Deutzia	Huadianba	In thicket	2850	21 v 1981
1058	Rhododendron yunnanense	Huadianba	Hillside	3250	21 v 1981
1059	Rhododendron decorum (Pink form)	Huadianba	Hillside	3100	21 v 1981
1060	Rhododendron decorum (White form)	Huadianba	Hillside	3100	21 v 1981
1061	Incarvillea mairei	Huadianba	Hillside	3100	21 v 1981
1062	Nomocharis	Huadianba	In thicket	3150	21 v 1981
1063	Iris? chrysographes	Huadianba	Open grassland	3150	21 v 1981
1079	Hydrangea scandens ssp. chinensis	Qingbixu	Bank above stream	2300	23 v 1981
1105	Berberis davidii	Qingbixu	Bank above stream	2200	23 v 1981
1150	Begonia taliensis	Qingbixu	In moss on rock face	2450	23 v 1981
1151	Daphne	Qingbixu	Hillside	2500	23 v 1981
1178	Rosa longicuspis	Santaipao	Hillside scrub	2450	24 v 1981
1189	Myrica nana	Santaipao	Hillside scrub	2450	24 v 1981
1193	Mahonia longibracteata	Santaipao	Hillside scrub	2350	24 v 1981
1204	Elaeagnus umbellata	Santaipao	Roadside scrub	2350	24 v 1981
1224	Gaultheria forrestii	Santaipao	Roadside scrub	2350	24 v 1981
1225	Rhododendron decorum	Santaipao	Roadside bank	2350	24 v 1981
1226	Gaultheria forrestii	Huadianba	Hillside	2950	19 v 1981
1227	Rhododendron virgatum	Huadianba	Dry hillside	2500	10 v 1981
1228	Hydrangea? villosa	Huadianba	Dry hillside	2500	10 v 1981
1229	Cruciferae	Huadianba	Dry hillside	3600	05 v 1981
1230	Castanopsis orthacantha	Huadianba	Dry hillside	-	07 v 1981
1231	Reinwardtia erigyna	Huadianba	Dry hillside	2000	17 v 1981
K067	Hypericum beanii	Dashao	Hillside	2400	26 iv 1981
K123	Keteleeria evelyniana	Kunming	10 km west of City in dry scrub	2100	28 iv 1981
K132	Clematis armandii	Anning	Around Caa Xi Temple	2025	29 iv 1981
K150	Daphne	Xiaguan road	260 km west of Kunming	2400	27 v 1981
K151	Hypericum beanii	Xiaguan road	260 km west of Kunming	2400	27 v 1981
K151A	Hypericum henryi[2] ssp. henryi	Xiaguan road	260 km west of Kunming	2400	27 v 1981
K153	Osteomeles schwerinae	Xiaguan road	70 km west of Kunming	2000	27 v 1981
K158	Buddleia paniculata	Kunming	Garden behind guesthouse	1950	26 iv 1981
K160	Rhododendron scabrifolium	Xiaguan road	260 km west of Kunming	2400	27 v 1981
K161	Rhododendron siderophyllum	Xiaguan road	74 km west of Kunming	2000	27 v 1981
K162	Camellia pitardii var. yunnanica	Xiaguan road	74 km west of Kunming	2000	27 v 1981
K163	Cupressus funebris	Kunming	Black Dragon Temple	1950	28 v 1981
K164	Osyris wrightii	Kunming	Botanic Garden	1950	28 v 1981
K165	Fokienia hodginsii	Kunming	Botanic Garden	1950	28 v 1981
K173	Enkianthus quinqueflorus	Hong Kong	Department of Agriculture Collection		
K174	Rhododendron championii	Hong Kong	Department of Agriculture Collection		
K175	Rhododendron championii	Hong Kong	Department of Agriculture Collection		
K178	Rhododendron scabrifolium ssp. spiciferum				

PLANTS BROUGHT BACK FROM THE EXPEDITION, NOW IN CULTIVATION

ROYAL BOTANIC GARDEN EDINBURGH - AUGUST 1983

NAME	SBEC	ACC. NO.	LOCALITY	HABITAT	ALT IN M	DATE
Acer davidii	0466	812526	Ziyang	Dry hillside	2560	10 v 1981
Acer flabellatum var. yunnanense	0305	812492	Shangchang	Broad-leaved forest	2800	07 v 1981
Acer forrestii	0154	812450	Duanqing	Broad-leaved forest	2900	04 v 1981
Aconitum brevicalcaratum	1050	812780	Huadianba	in a thicket	3150	21 v 1981
Adiantum c.f. pedatum	0878	812631	W of Huadianba	Broad-leaved thicket	3000	19 v 1981
Agapetes mannii	1114	812687	Qingbixu	Rocks	2500	23 v 1981
Ancylostemon convexus	0595	812559	Lower slopes of Longquan Peak	Shaded ravine	3100	15 v 1981
Androsace rigida var. minor	0723	812597	Xiaohuadianba	Open hillside on limestone	3100	18 v 1981
Androsace spinulifera	0798	812766	Xiaohuadianba	Open hillside	3100	18 v 1981
Androsace sp.	0572	812557	Longquan Peak	Open upper slopes	3700	14 v 1981
Anemone demissa var. yunnanensis		812769				
Anemone trullifolia	0797	812614	Xiaohuadianba	Open slopes	3000	18 v 1981
Asparagus pseudofilicinus	0765	812605	Xiaohuadianba	Open hillside	2950	18 v 1981
Beesia calthifolia	0918	812644	Huadianba	Shaded bank above stream	3300	20 v 1981
Begonia taliensis	1150	812697	Qingbixu	in moss on rock-face	2450	23 v 1981
Bergenia purpurascens var. delavayi	0517	812744	Longquan Peak	Wet gully	3600	13 v 1981
Betula utilis	0816	812625	Huadianba	in side gully	3000	19 v 1981
Buxus bodinieri	K168	812718	Kunming	cultivated	1950	30 v 1981
Buxus harlandii	K167	812717	Kunming	cultivated	1950	28 v 1981
Cacalia aff. pentaloba		812643				
Calanthe sp.	0902	812639	Huadianba	Forest	2950	19 v 1981
Cardiocrinum yunnanense	1054	812669	Huadianba	Thicket	2900	21 v 1981
Cardiocrinum sp.		812754				
Chrysosplenium davidianum	0231	812474	Xieniupingdi	by stream in forest	3000	05 v 1981
Clematis chrysocoma	0167	812453	Sanchaohe	in forest	2200	04 v 1981
Clematis c.f. pogonandra		812786				
Coelogyne corymbosa	0216	812812	Xieniupingdi	Epiphyte in forest	2700	05 v 1981
Coelogyne corymbosa		812810				
Corydalis curviflora var. rosthornii	0727	812610	Xiaohuadianba	Open hillside	3100	18 v 1981
Corylopsis yunnanensis	0692	812592	Huadianba	Hillside	2700	17 v 1981
Craibiodoendron yunnanensis	1223	812703	Santaipo	Sandy hillside	2250	24 v 1981
Daphne sp.	0961	812649	Wutaishan, Huadianba	Bank above stream	3050	20 v 1981
Davallia sp.	0440	812523	Shangchang	on a rock in forest	2700	09 v 1981
Delphinium bulleyanum	0611a	812574	Longquan Peak	Shaded ravine	3100	15 v 1981
Dendrobium aff. candidum	0174	812807	Sanchaohe	in forest	2200	04 v 1981
Dendrobium sp.	0067	812805	Dapingdi	Epiphyte, in forest	2700	03 v 1981
Diapensia bulleyana	0518	812537	Longquan Peak	Soil-covered rocks	3600	13 v 1981
Dichroa febrifuga	K167	812725	Hong Kong	Cultivated		03 vi 1981
Drynaria fortunei	0715	812792	Road to Huadianba	Rock face by road	2600	17 v 1981
Equisetum palustre	1146	812692	Qingbixu	Among rocks by river	2300	23 v 1981
Euonymus vagans	0151	812448	Duanqing	in forest	2900	04 v 1981
Euonymus sp.		812787				
Fern	0338	812498	Shangchang	Epiphyte in forest	2800	07 v 1981
Fern	0441	812524	Shangchang	Epiphyte in forest	2800	09 v 1981
Fern	0716	812790	Road to Huadianba	Rock face above road	2600	17 v 1981
Fritillaria cirrhosa	0353	812504	Jiucaipo	Among Rhododendrons	3300	08 v 1981
Gastrochilus c.f. pseudodistichus	1145	812809	Qingbixu	Hillside	2400	23 v 1981
Gastrochilus sp.	0110	812806	Dapingdi	Epiphyte in forest	3000	03 v 1981
Gaultheria sinensis	0960	812788	Wutaishan	On a mossy bank	3200	20 v 1981
Gaultheria sinensis		812513				
Gentiana melandrifolia	0368	812512	Jiucaipo	Exposed ridge	3800	08 v 1981
Gentiana melandrifolia	1052	812667	Huadianba	Open hillside	3150	21 v 1981
Gentiana ternifolia	1053	812668	Huadianba	Open hillside	3100	21 v 1981

NAME	SBEC	ACC. NO.	LOCALITY	HABITAT	ALT IN M	DATE
Geranium yunnanense	0962	812650	Wutaishan	Bank above stream	3050	20 v 1981
Geranium sp.		812611				
Goodyera repens	0200	812791	Xieniupingdi	Forest floor, in shade	2850	05 v 1981
Hedera nepalensis var. sinensis	0327	812495	Shangchang	Forest	2700	07 v 1981
Holcoglossum	0380	812808	Shangchang	Epiphte on Alnus	2700	09 v 1981
Hypericum acmosepalum	1064	812677	Xiaguan, hot springs	Hillside above road	1850	23 v 1981
Hypericum sp. nov. No. 1	1081	812684	Qingbixu	Rocky hillside	2300	23 v 1981
Hypericum henryi ssp. nov. No. 2	1166		Santaipo	Roadside	2700	17 v 1981
Hypericum sp.	0964	812652	Wutaishan	Bank above river	3200	20 v 1981
Hypericum sp.	1141	812688	Qingbixu	Rocky hillside	2500	23 v 1981
Iris aff. tectorum	0031	822734	Mahungou	Moist shaded bank ? cult.	2000	02 v 1981
Iris chrysographis		813114	Nr. Huadianba	Boggy meadow	c3000	21 v 1981
Jasminum humile	0657?	812795	Road to Huadianba	Roadside	2700	17 v 1981
Juniperus recurva var. coxii	0348	822514	Jiucaipo	in Rhododendron thicket	3450	08 v 1981
Libocedrus macrolepis	K154	812712	70 km from Kunming to Xiaguan	Roadside bank	2000	27 v 1981
Ligularia intermedia	0189	812464	Duanqing	Forest	2800	04 v 1981
Lilium sp.		812771				
Mahonia longibracteata	0636	812582	Longquan Peak	Among scrub in gully	3200	15 v 1981
Mahonia longibracteata	0954	812798	Wutaishan	Amongst Bamboo	3300	20 v 1981
Meehania fargesii	1078	812682	Qingbixu	Shaded bank	2450	23 v 1981
Nomocharis pardanthina	0635	812578	Longquan Peak	Shaded ravine	3100	15 v 1981
Nomocharis pardanthina	0503	812530	Track to Longquan	Bank by track	3000	12 v 1981
Nomocharis pardanthina	0968	812655	Wutaishan	Bank above stream	3200	20 v 1981
Notholirion sp.	0963	812651	Wutaishan	Bank above stream	3050	20 v 1981
Oxalis griffithii	0967	812767	Wutaishan	Bank above stream	3200	20 v 1981
Paeonia delavayi var. lutea	0794	812613	Xiaohuadianba	Open hillside	2950	18 v 1981
Paris polyphylla var. thibetica	0126	812444	Duanqing	Forest, in shade	2900	04 v 1981
Paris polyphylla var. yunnanensis f. alba	1031	812662	Huadianba	in a thicket	3150	21 v 1981
Paris polyphylla		812738				
Paris violacea	0179	812456	Duanqing	in forest	2900	04 v 1981
Paris violacea	0314	812493	Shangchang	in forest	2900	07 v 1981
Paris pubescens	0662	812588	Huadianba	Hillside	2700	17 v 1981
Panax sp.	0637	812765	Longquan Peak	Shaded ravine	3100	15 v 1981
Pentapanax leschenaultii	0965	812653	Wutaishan	in Bamboo thicket	3350	20 v 1981
Pieris formosa	0578	812561	Longquan Peak	Mountain slopes	3300	14 v 1981
Pleione yunnanensis	0066	812425	Dapingdi	Shaded bank	2700	03 v 1981
Pleione forrestii	0108	812449	Dapingdi	Epiphyte in forest	3000	03 v 1981
Pleione forrestii	0206	812468	Duanqing	Mossy rock face	3100	04 v 1981
Pleione bulbocodioides	0205	812467	Duanqing	Mossy rock face	3100	04 v 1981
Polygonatum fuscum	0882	812755	Huadianba	in forest	2900	19 v 1981
Primula membranifolia	1076	812679	Qingbixu	Mossy rock face	2450	23 v 1981
Primula septemloba	1051	812778	Huadianba	in a gully	3150	21 v 1981
Primula sinolisteri	1077	812681	Qingbixu	Mossy rock face	2450	23 v 1981
Primula sonchifolia	0610	812573	Longquan Peak	Shaded ravine	3100	15 v 1981
Pyrola sp.	0541	812541	Longquan Peak	Open hillside	3600	13 v 1981
Rhodiola yunnanensis	0602	812571	Longquan Peak	Shaded ravine	3100	14 v 1981
Rhododendron balfourianum	0554	812935	Longquan Peak	Ridge near summit	3850	13 v 1981
Rhododendron c.f. brachyanthum	0641	812581	Longquan Peak	Shaded gully	2800	15 v 1981
Rhododendron cephalanthum	0751	812602	Xiaohuadianba	Open hillside	3100	18 v 1981
Rhododendron cyanocarpum	0349	812501	Jiucaipo	Exposed hillside	3400	08 v 1981
Rhododendron edgeworthii	0607	812572	Longquan Peak	Shaded ravine	3100	13 v 1981
Rhododendron edgeworthii		812933				
Rhododendron heliolepis	0363	812507	Jiucaipo	Exposed ridge	3500	08 v 1981
Rhododendron lacteum	0345	812500	Jiucaipo	Exposed ridge	3500	08 v 1981
Rhododendron sinogrande	0104	812434	Dapingdi	in forest	3000	03 v 1981
Rhododendron sulfureum	0249	812480	Dashichang	by rock	3400	05 v 1981
Ribes laurifolium	0316	812495	Shangchang	Forest margin	3000	07 v 1981
Rodgersia sp.		812568				

NAME	SBEC	ACC. NO.	LOCALITY	HABITAT	ALT IN M	DATE
Rosa omeiensis	0250	812481	Dashichang	Bamboo thicket	3400	05 v 1981
Rosaceae Indet.		812554				
Roscoea thibetica	1221	812701	Santaipo	Shaded bank above road	2350	24 v 1981
Rubus tricolor	0188	812463	Duanqing	in forest	2800	04 v 1981
Salix sp.	0580	812563	Longquan Peak	Slopes below summit	3900	14 v 1981
Saxifraga rufescens	0639	812579	Longquan Peak	Shaded ravine	3100	15 v 1981
Schefflera sp.		812799				
Skimmia laureola ssp. multinervia	0852	812628	Huadianba	in side valley	2900	15 v 1981
Smilacina yunnanensis	0506	812535	Longquan Peak	Open hillside	3550	13 v 1981
Sorbus vilmorinii	0970?	812796	Wutaishan	Bank above stream	3300	25 v 1981
Sorbus aronoides		812794				
Thalictrum alpinum	0799	812615	Xiaohuadianba	Open hillside	3100	18 v 1981
Thalictrum javanicum	1222	812762	Santaipo	Shaded bank above road	2350	24 v 1981
Trillium tschonoskyi	0612	812575	Longquan Peak	Shaded ravine	3100	15 v 1981
Tupistra aurantiaca	0086	812431	Dapingdi	in forest	3000	03 v 1981
Vaccinium delavayi	0068	812426	Dapingdi	in forest	2700	03 v 1981
Vaccinium delavayi	0114	812437	Dapingdi	in forest	2800	03 v 1981
Vaccinium delavayi	0243	812478	Dashichang	in a thicket	3400	05 v 1981
Veratrum taliense	1142	812689	Qingbixu	Rocky hillside	2400	23 v 1981
Viburnum cordifolium	0252	812482	Dashichang	in forest	3400	05 v 1981
Viburnum chingii	0302	812491	Shangchang	in forest	2950	07 v 1981
Vitis		812785				

Appendix 4

Health Cover for Expeditions to S.W. China

The London School of Hygiene and Tropical Medicine advised us that we should be covered for Malaria, Cholera and Typhoid and we should take Malaria pills with us. A gamma globlin injection for Hepatitus prior to departure was also recommended.

Up to date cover for T.B., Polio and Tetanus was also necessary to cover these diseases.

Protection against rabies is not normally included in injection programmes and it is left to the individual to determine if this cover is prudent.

Diarrhoea is possibly the worst problem which could be encountered, so provision should be made for this.

First Aid Kit

Obviously a kit to cover possible eventualities must be included with the expedition equipment. In the event we were covered by our own pack comprising:-

Bandages

1 Unbleached Triangular
1 BPC Crepe 5cm x 4.5m
1 BPC Crepe 7.5cm x 4.5m

Tablets

4 boxes Puritabs (water purification tablets)
2 boxes Streptotriads
1 container Sur-Lax
2 sachets Salt tablets
1 sachet Lomotil tablets
2 sachets Septrin tablets
2 sachets Penbritin capsules
2 containers Senokot tablets
1 container Magnesium Tricil-co-tablets
1 box throat pastilles
1 bottle Lasix tablets
1 bottle Codeine tablets
1 box Paracetamol tablets

Powders

1 bottle Tineafx powder
2 bottles Crystal Violet B.P.
1 pack Kaoline powder

Ointment

1 bottle Magnesium paste B.P.C.
1 tube Sun screen lotion
1 tube Iodex ointment
2 tubes Caladryl cream

Miscellaneous

1 pack assorted plasters
1 pack Antiseptic wipes
1 pack adhesive foam (corns etc.)
1 pack adhesive Moleskin (corns etc.)
1 pair foot cushions
1 bottle Friars Balsam
1 spray Otrovine-Antistin (nasal spray)
1 pack Anusol suppositories
1 tube tooch stopping
3 safety pins

I am grateful to Thomas Cook for loaning us their Himalayan Medical Kit.

A doctor was seconded to the joint expedition from the Dali Bai Autonomous Prefecture administration.

All water was boiled for several minutes for this is the most effective way of destroying disease organisms in the field. Southeast Asia has a high incidence of Amoebic and Bacillary Dysentery, Typhoid and Malaria. Hygiene therefore is extremely important.

Health in the field

On the whole, the expedition was free from digestive troubles and other ailments with the exception of Mitchell and Guan Kaiyun, the interpreter, who were confined to camp for three and one day respectively with a persistent cough due to a throat infection. The doctor remained in camp on those occasions and was most attentive.

Apart from a few very minor ailments and insect aggrevations, nothing of any real consequence called for medical attention, thanks to the valient efforts of the Chinese cooks, the ever present and diligent doctor and the first class organisation by the staff of the Kunming Institute of Botany.

R.J. Mitchell with a group of Lisu children in Yangbi County.

Photograph by R.J. Mitchell.

Appendix 5

Yangbi County Suggestions

Britain was covered in forest at one time and gradually during the past 2,000 years most of this has disappeared. Only 9% is now covered with woodlands.

The reduction in tree cover has led to a change in the climate - to a warmer and drier regime on the eastern half of the country. As a result, wind blown soil is a problem in the spring before crops cover the ground, thus stabilizing the soil.

A forestry replanting programme is under way to try to replace some of the forests but it is a long term project. Most of Britain's timber requirements have to be imported at a cost of £1,000 million per year.

Mitchell has been worried about the reduction in tree cover in lowland Scotland for some time and convened and chaired a conference on "Trees in the Landscape" with a view to changing attitudes among the farming community particularly concerning the value of trees providing shelter, erosion control and increased plant and animal yields. (Another conference took place on the same subject in 1982).

The situation in Yangbi county is not the same as in Britain but we forsee trends which if left unchecked may result in a similar situation.

We are distressed at the extent of forest burning, especially on steep slopes which in the long term will become unprofitable to manage for crops or for pasture and erosion will become a major problem.

Clear felling water catchment areas in North America resulted in a reduction of rainfall, massive erosion, and the abandonment of dams which filled up with silt.

A natural vegetation absorbs rainfall and gives it up over a longer period. Thus supplies of water are constant and not liable to extremes of supply.

In order to ensure a plentiful supply of water, to prevent soil erosion, and to ensure a plentiful supply of timber for all the communities needs, we suggest that the steep slopes should be left alone as natural vegetation

and those too steep to cultivate and which only provide a medicum of grazing at the best of times, be planted with the desirable native trees to provide timber, shingles, and firewood for the needs of the community. Animals should be excluded from the young plantations but can be allowed to graze when the trees are large enough, thus providing the necessary forage for the animals. If left alone these woodlands could provide other plants with a variety of uses - medicinal etc.

We suggest that, with the warm climate of Yangbi county, a greater diversification of crops be attempted. The industry of the people has impressed us and, with guidance their skills could be adapted to the orchard cultivation of peaches, apples, plums, hazel nuts, and/or pears. These will not only provide an excellent fruit crop but also their roots will help to stabilize the soil against erosion, and with the use of local bees to pollinate the flowers, additional honey will be provided.

These orchards can be underplanted with legumes such as alfalfa and clovers which grow well on poorish soils because of their ability to produce their own nitrogen, and will provide additional forage for animals with extra soil stabilizing properties.

The soil in this area is very similar to the wine producing countries of Europe and vines would probably do well on the higher slopes at say 2,400 m. altitude. Grapes could be collected and brought to a centre for producing wine and would produce additional income for the Prefecture.

We have already noted the large number of walnut trees in Yangbi county. They are famed throughout China and in western Europe. Their needs are similar to those of the vine and the indications seem good for a successful crop.

Similarly in southwestern Europe, the Carob Nut, Ceratonia siliqua, also grows in such areas, and the fruits provide a high protein yield for livestock. Thus the needs of high pasturage of animals can be reduced, easing the pressure on the forest which contains one of the most diverse collection of plants in the warm temperate regions.

Summary

We have tried to tackle this very complex subject with understanding and with a view to future needs. The immediate problem is to conserve and increase the forest area to enable a constant supply of timber trees and to conserve water supplies and prevent soil erosion.

Additional crops have been suggested and with underplanting of perennial forage crops this will help stabilize the soil while also providing for animals and as such will reduce the pressures on grazing of the high slopes where the natural vegetation should be encouraged to re-establish.

Robert J. Mitchell.

Appendix 6

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PETER COX

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