

Annapurna Botanical trek, May to June 2012, with Chris Fraser-Jenkins, Sagun Pariyar and Jacob Fraser-Jenkins. Photocaptions for slideshow.

SET 1 PHOTOS:

1. A proper job for "Just stop oil" into action?! - a lovely bit of normal every-day Asian pollution; road down from Kathmandu, 29 May 2012.
2. *Pteris biaurita* subsp. *walkeriana*, typical raised, pointed costal arches, occasionally a few free, Pokhara to Birethanti, 30 May 2012.
3. *Cyathea* (*Alsophila*) *spinulosa* in Moonlight Lodge garden, Birethanti, at start of Annapurna Base Camp trek, 1050 m.
4. Jeep-transport coming down the new rough road-track near Birethanti.
5. Presumptive *Pteris vermae*, with erect fronds, shortish narrow pinnae, and relatively short terminal segments (unlike *P. vittata*), should be diploid, awaiting investigation.
6. *Pteris vermae*, a new species related to *P. vittata*, but short, narrow pinna'd and erect.
7. Large *Pteris vermae* again (with one *P. vittata*, drooping pinnae, in centre), near Shyauli Bazaar. Same plant as Photo 429.
8. Modi khola river, near Shyauli Bazaar.
9. A welcome *chautara* (rest-place), Shyauli Bazaar, 1200 m, Sagun, Jacob and Sunil, our local porter hired at Annapurna Committee agreed rates.
10. *Davallia bullata*, with long, reddish-scaly rhizome on rocks or trees.
11. Jacob's temporary dog-walking companion, going trekking.
12. *Drynaria propinqua*, epiphyte on bare tree-trunk above Modi khola.

13. Beautiful *Crinocardium* lily on the wayside with the abundant *Nephrolepis cordifolia*.
14. The "Last packet of crisps", one-star roadside restaurant at Khliu, above Shyauli, 31 May 2012.
15. Looking back down lower Modi river from Khliu.
16. *Pteridium revolutum*, the crispy bracken of most of south Asia, pinnae vernating before apex, hard texture and more hairy beneath than *P. aquilinum* of Europe, but equally poisonous, commonly fertile.
17. *Onychium siliculosum*, common lower-altitude fern with bright yellow farina on sori beneath, cannot be transplanted successfully, but easily grown from spores, on stones etc.
18. Looking up the lower Modi khola valley.
19. Deep, dark, forested gorge across the valley, must be an unspoilt lower-altitude fern-paradise, but too long a climb down to get into it.
20. First view of Annapurna South and Hiunchuli Himal up ahead - the "vanilla ice-cream bank" that encouraged our Jacob onwards!
21. Rice-terraces on lower valley sides, near Khliu.
22. Making *doko*, carrying-baskets, in Siwai village at the end of the road, where the new road-track runs out and the foot-path begins.
23. British Gurkha Regiment-made pedestrian suspension-bridge above deep stream valley at Siwai.
24. Sagun walking the swinging bridge.
25. A brief rest at a *chautara* resting- and gossip-place on the way beyond Kyumi, 1300 m.

26. Large *Aleuritopteris* (formerly *Cheilanthes*) *rufa* - hairy rachis and costae and weak, thin, whiteish flavinoid farina beneath.
27. Underside of *A. rufa* in hand.
28. Annapurna South 7273 m; the Base Camp lies behind it.
29. Farm-sheds for Buffalo by path towards Kyumi.
30. *Drynaria propinqua* covering tree-trunk, green fertile-leaves and old brown basiphyls, with pale pink *Dendrobium* orchid in flower.
31. *Drynaria propinqua*, closer.
32. *Drynaria propinqua* fertile leaves.
33. *Drynaria* and snow-peak, a typical view in the Nepal Himalaya.
34. Delightful Kyumi Lodge in Annapurna Conservation Area buffer zone. Jacob got there first!
35. Map-board outside Kyumi Lodge, a long way to go over the next several days.
36. Jacob NOT touching the Himalayan stinging-nettle, *Girardinia diversifolia*. It is used to make cloth, without the sting.
37. Only pretending! - keep one's distance! It stings more sharply than the common European nettle, *Urtica dioica*.
38. *Asplenium laciniatum* subsp. *laciniatum*, an unusually large plant, but good large sized spores on checking with the microscope, so not one of its hybrids; and *Polystichum lentum* behind, Kyumi to New Bridge.
39. *A. laciniatum* subsp. *laciniatum* (homotypic synonym *A. varians*), showing the rather coarse segments, not much stipitate.
40. *A. laciniatum* subsp. *laciniatum*, typical small plants.
41. The beautiful *Pteris normalis*, semi-adult frond, changing from pink to green; typical wide frond, fewish pinnae, large apiculate segments with no setae, and very rough-surfaced pink stipe.
42. *Pteris normalis*.
43. *Pteris aspericaulis*, long frond, many pinnae, blunt apiculate segments, slightly rough, often pink stipe and rachis, spines above costae and some setae above segments.
44. *Pteris aspericaulis*, closer, showing spines on costae
45. Path beside stream, *Polyodiodes lachnopus* on tree-trunk.

46. *Pteris subquinata*, a small lithophyte below calcareous-rock overhangs, it also has a spectacular white-banded form from Sikkim eastwards.
47. Path between *Dennstaedtia appendiculata* clumps, with *Davallodes* on a large boulder behind.
48. A fine colony of *Davallodes membranulosa* (with hairy axes), colonising a large boulder, Kyumi to New Bridge.
49. *Davallodes membranulosa* fronds.
50. *Davallodes membranulosa* rhizome.
51. Jacob, the King of *Drynaria* Castle!
52. Probably just a weird *Pteris biaurita* pretending to be *P. wallichiana*? But I forgot to check if it had any teeth and what the veins and spores were like.
53. *Aleuritopteris formosana* (syn. *Cheilanthes brevifrons*) loves old stone walls without cement.
54. *Aleuritopteris formosana*, rather narrow fronds in larger plants, bullulate wrinkled upper surface and narrow bicolorous scales beneath that extend some way up the rachis but not onto the pinna-costae.
55. *Aleuritopteris formosana*, bright white flavinoid farina beneath.
56. *Aleuritopteris dubia*, wider fronds, all axes hairy (actually narrow fibril-like scales), Kyumi to New Bridge.
57. *Aleuritopteris dubia* close-up. The phloroglucides in the white farina are the same as in *A. rufa* and *A. albomarginata*, unique in this genus, where all other species are qualitatively very different.
58. *Aleuritopteris dubia* beneath, with many fibrils on costae and even costules and white farina (but farina absent on larger monsoon-grown Summer fronds).
59. *Microlepia setosa*, narrowish triangular fronds.
60. *Microlepia setosa* frond-base; fronds arise from a creeping rhizome, not very far apart.
61. *Vittaria* ("Haplopteris") *flexuosa*, hanging off tree-trunk near New Bridge, long lines of sori with an inner ridge as well as the outer margin.
62. *Vittaria flexuosa*, *Drynaria propinqua*, *Asplenium yoshinagae* subsp. *indicum*, *Leucostegia immersa* (nom. cons.) and *Nephrolepis cordifolia*.
63. A whole tree of *Vittaria flexuosa* and *Drynaria propinqua*.

64. New Bridge Lodge.
65. *Tectaria morata* (the "overlooked *Tectaria*"), a new species, near New Bridge from Kyumi.
66. *Tectaria morata* - turned out to be a new species, and not the related *T. coadunata*, which is more hairy and has different sori, nor *T. dubia*, as I first thought, which is very different.
67. *Tectaria morata*, close-up of pinna apex.
68. *Tectaria morata*, few, large sori, few free included veinlets, succulent texture, subglabrous beneath, few scales confined to stipe-base.
69. *Tectaria morata* frond.
70. *Tectaria morata* fertile pinnules top surface.
71. A nice cool drink, but only for the Buffalo-in-the-manger! - it couldn't be shifted, nor would let anyone else take a drink, Khyumrung khola (river), beyond New Bridge.
72. *Athyrium cuspidatum* (NOT a separate genus, "*Anisocampium*"), New Bridge.
73. Lodges at Jhinu, 1750 m, at start of steep climb up towards Chomrong.
74. *Aleuritopteris dealbata* (syn. *Cheilanthes doniana*), superbly white beneath and long fronds, slightly bicolorous scales. This might be part-ancestral to the tetraploid *A. anceps*, perhaps with *A. formosana* as the other diploid? Needs looking into.
75. *Woodwardia unigemmata* - which usually has two or even three proliferous bulbils in reality, despite its name.
76. Looking north up Modi Khola towards the unsettled and natural forested core area of Annapurna Conservation Area.
77. *Leucostegia immersa*, bronze and green young fronds, with *Polypodiodes lachnopus*, above Jhinu, 1 June 2012.
78. *Onychium cryptogrammoides* but a consistently smaller, flatter-fronded form at lower altitude, Jhinu 1750 m, to compare spores with subsp. *fragile*.
79. *Onychium cryptogrammoides* subsp. *fragile*, small, flat fronds. Cytology would be desirable as the subsp. *fragile* type plant is triploid and the common subsp. *cryptogrammoides* is diploid.
80. *Onychium cryptogrammoides* small form, probably subsp. *fragile*, green stipe, drying stramineous, with short, black base, at Jhinu.
81. Looking down at Jhinu, and inaccessible dense forest on south-east side of the Modi valley, from less than a quarter-way up the steep ascent to Chomrong.

82. *Huperzia hamiltonii* (broader leaves) and *H. pulcherrima*, but, as often occurs, with an intermediate-leaved branch (lower right), all in one colony.
83. *Huperzia pulcherrima*, the *subulifolia* form, though not as long-pendent as larger plants.
84. *Dryopteris carolihopei*, horizontal semi-subterranean rhizome, often only one or two fronds, unlike the more eastern *D. marginata*, Jhinu to Chomrong.
85. *Dryopteris carolihopei*, Jhinu to Chomrong.
86. *Selliguea oxyloba*, decurrent lamina-base and un-notched margins, Jhinu to Chomrong.
87. *Asplenium khullarii*, with acute lobe-apices and bi-elliptic lobes, in wall at top of climb just before Chomrong.
88. *Asplenium khullarii*, wall above and just before Chomrong.
89. *Asplenium laciniatum* subsp. *kukkonenii*, narrow fronds, small segments, elongated fused frond-apices, wall above and south of Chomrong, 2100 m; with a small *Aleuritopteris albomarginata* and *Selaginella chrysocaulos* shoots (from bulbils in ground).
90. *Asplenium laciniatum* subsp. *kukkonenii*, wall above and S. of Chomrong, 2100 m.
91. Chomrong sign-board - the "metropolis" [maybe!] of the Annapurna lower hills.
92. Path down steps and Hotel (with a small Coke at 250 rupees - 25 down in Pokhara! in 2012), Chomrong - but remember all has to be carried up by porters and ponies.
93. Chickens come super-fresh right off the menu in Chomrong Hotels!
94. Village school assembly-time, Chomrong (*Dennstaedtia appendiculata* in wall on left).
95. The supermarket at the end of the universe! - Chomrong. Prices appropriately fixed for foreign incomes, but better than elsewhere to stock up from before walking further up into the core-area.
96. Jacob, Sagun and our guide, Sunil, on the walk all the way down again to cross the stream below and beyond Chomrong, only to climb back up again on the other side.
97. The path down to the river-crossing - and then up again beyond, into the core-area forests.
98. *Pteris aspericaulis*, a nearly green-axis plant, long lamina, many pinnae, Chomrong khola.
99. *P. aspericaulis*, close-up showing the abruptly apiculate segment-apices.
100. The White Commodore butterfly, identified from Colin Smith's fine butterfly books of Nepal.

101. *Dryopteris chrysocoma*, pale stipe- and rachis-scales, tall, thick indusia and erect fronds, Chomrong to Sinuwa.
102. *Dryopteris chrysocoma*, young sori, Chomrong to Sinuwa, 2200 m.
103. *Katoella pulchra*, finely dissect, slightly narrowly triangular fronds, long stipe and thinnish, very knobbly rhizome, near Sinuwa.
104. Flowery lodge and constantly busy clothes-lines for drying, lower Sinuwa.
105. A harmless and attractively patterned ?Natrix snake - unfortunately conservation cuts little ice in this village - for snakes, anyway.
106. *Pteris wallichiana*, densely short-bristly stipe form, the Umbrella Fern, lower Sinuwa.
107. *Pteris wallichiana* - the densely bristly stipe, Sinuwa.
108. Jacob's friendly following goat, Sinuwa.
109. Sagun and all the tired horses in the sun, Sinuwa.
110. Jacob and Sunil, our porter, up a tree next to a clump of *Goniophlebium argutum*, above Sinuwa.
111. *Polystichum mucronifolium* (syn.: *P. heteropaleaceum*, ?*P. tacticopterum*), entering the core-area forest, Sinuwa to Bamboo Lodges, 2300 m.
112. *Polystichum mucronifolium*, wide scales in tufts at pinna-rachis junctions; lower pinna-axils and stipe have some dark centred scales, large dark-centred scales at the base of the stipe.
113. Path among old trees in the core-area of Annapurna Conservation area, Sinuwa to Bamboo lodge.
114. A fine stand of *Dryopteris wallichiana* subsp. *wallichiana* shuttlecocks in the lower Polysticho-Dryopteridetum forest, Sinuwa to Bamboo Lodge.
115. *D. wallichiana* subsp. *wallichiana* by the path.
116. *D. wallichiana* subsp. *wallichiana* long, very narrow dark-brown stipe- and rachis-scales.
117. *Lepisorus loriformis*, a pendent epiphyte with leathery-succulent fronds, varying in width, which are pinkish when young and have infra-marginal sori.
118. *L. loriformis* underside, forest from Sinuwa to Bamboo lodges.
119. *Coniogramme pubescens* (misapplied name "*C. caudata*"), note narrowly cuneate pinna-bases unlike the widely truncate ones of the type of *C. caudata*, which is a synonym of *C. serrulata*.

120. *Coniogramme pubescens*, Sinuwa to Bamboo Lodges, 2300 m.
121. Strange *Aristolochia* ?*griffithii* flowers, fallen off climber.
122. *Aristolochia* - very large tuba-like flowers.
123. *Pteris wallichiana* young fronds taller than me, hairy stipe form, Sinuwa to Bamboo Lodges, 2300 m.
124. Densely forested Modi Khola valley beneath the pre-monsoon clouds, looking north.
125. Path through an unusual grassy rock-slope with many interesting wild flowers.
126. An attractive *Roscoea* species (?*R. alpina*) on the grassy slope.
127. Flowers from the path beneath a late-flowering individual of *Rhododendron arboreum*, Nepal's *Lali Gurans*, that flowers in huge masses on the mountain-sides in early Spring, 1 June 2012.
128. *Thelypteris mollissima* ("*Leptogramma* or *Stegnogramma pozoi*" sensu auct. Ind.), free veins, creeping rhizome; with a baby *Coniogramme procera* behind it, wet places all along path near Bamboo Lodge, 2200 m.
129. *Thelypteris mollissima*, elongated sori, veins nearly all free, rhizome horizontal, thickish, Bamboo to Dovan Lodges.
130. Superb basket-crown of *Polystichum longipaleatum*, near Bamboo Lodge.
131. *Polystichum longipaleatum*, when fronds first come up, the hanging tips are like bunches of large brown hairy caterpillars.
132. *P. longipaleatum* close-up showing spectacular hair-like fibrils on the pinnules.
133. *Polystichum longipaleatum* (misapplied name: *P. discretum*, syn. *P. setosum*), glossy and hairy fronds.
134. *Cornopteris banajaoensis*, first named from the Philippines, Bamboo Lodge.
135. *Athyrium decorum*, near to *A. dubium*; Chinese botanists clarified it is not *A. dubium*, short-horizontal, thick rhizome and very short or hardly any setae above segments.
136. *Athyrium decorum*, ridges above segment-midribs, rather than actual setae.
137. *Athyrium decorum*, not previously known from Nepal or India, with pink rachis, near Dovan Lodge.
138. *Athyrium decorum* showing ridges above pinnule-midribs, hardly extending to very small apical extensions, not the prominent setae of members of Section *Strigoathrium*, Dovan.

139. Pre-monsoon thunder-shower, Bamboo Lodge.
140. *Selaginella bisulcata*, fertile plant apex showing large heteromorphic sporophylls, Bamboo Lodge.
141. Machapuchare "Fish-tail" peak, clear in the morning, Bamboo to Dovan Lodges, 2 June 2012.
142. *Dryopteris wallichiana* subsp. *convexa* (syn.: subsp. *himalaica*), rounded, convex segments, broad, dark or dark-streaked stipe-scales, Bamboo to Dovan Lodges, c. 2400 m.
143. *D. wallichiana* subsp. *convexa*, close-up of pinnules.
144. *D. wallichiana* subsp. *convexa*, impressed veins on pinnules, a bit reminiscent of *D. splendens*.
145. *D. wallichiana* subsp. *convexa*.
146. *D. wallichiana* subsp. *convexa*.
147. *D. wallichiana* subsp. *convexa*.
148. A stand of *Thelypteris* (*Pseudophegopteris*) *microstegia* subsp. probably *hirtirachis*, rather thickish but creeping rhizome, wide, less lobed pinnules, hairs and scales on stipe, forest between Bamboo and Dovan Lodges, c. 2400 m.
149. *Thelypteris microstegia* subsp. *hirtirachis*, lower pinnae, Bamboo to Dovan lodges.
150. Small plants of *Asplenium laciniatum* subsp. *tenuicaule* on rock in forest among *Trichomanes* (*Crepidomanes*) *latealatum* (no hairs on stipe-wing), near Dovan Lodge.
151. *Cyrtomium anomophyllum*, hardly auriculate pinnae with widely rounded basiscopic bases as in *C. macrophyllum*, but many small teeth in apical part of pinna, near Dovan.
152. *Cyrtomium anomophyllum*, though a rather weakly toothed pinna-apex compared to most.
153. *Cyrtomium anomophyllum* (syn. *C. microindusium*), sori with indusia showing dark, depressed centres.
154. Forest path near Dovan, 2500 m.
155. *Trichomanes* (*Crepidomanes*) *latealatum* covering tree-trunk, with some *Lepisorus loriformis*.
156. Machapuchare, the Fish-tail twin peak.

SET 2 PHOTOS:

157. Machapuchare, "fish-tail" twin-peaks from Dovan , a Himalayan Matterhorn, but rather higher.
158. A little log-bridge along the path, Jacob always first!
159. Large white lily, *Lilium* ??*wallichianum*, soon to open its flowers.
160. *Pichisermollodes stewartii* on tree, long, up-swept pinnae (directed towards frond-tip); with *Lepisorus mehrae* on upper left, Dovan, 2500 m.
161. *Pichisermollodes stewartii*, with its green rhizome and contrasting dark scales and apical lamina-lobes long and upswept towards the frond-apex.
162. *Dryopteris juxtaposita* (well lobed individual), Dovan.
163. Trekking-map sign-post at Dovan Lodge, walking times - unless looking at ferns!
164. *Polystichum thomsonii*, showing variation in degree of lobing etc., Dovan to Himalaya Lodge, c. 2700 m.
165. The little Grammitid epiphytic fern, *Micropolypodium sikkimense*, has long, stiff dark bristles all around the edge of the frond, Dovan to Himalaya lodge.
166. Another little Grammitid, *Tomophyllum donianum* (misapplied name "*Ctenopteris subfalcata*" in India), Dovan to Himalaya Lodge.
167. The abundant epiphytic filmy fern in moss, *Hymenophyllum tenellum* (misapplied name "*H. polyanthos*" from the Americas), usually with emarginate, notched lobe-apices, Dovan.
168. Large stand of miniature prickly *Polystichum stimulans* (it does!) under rock in forest, Dovan.
169. *Polystichum stimulans* on mossy rock, near Dovan.
170. *Katoella* ("*Araiostegia*") *beddomei*, pinkish lilac rachis, long delicate fronds, near Dovan.
171. *Katoella beddomei*, rhizome with large, loose, overlapping scales, aptly described by Hope as like (white-) grape-skins, forest above Dovan, c. 2700 m.
172. A small plant of *Coniogramme procera*, which can easily reach 6 ft. tall, long pinnae with many short pinnules, when crushed smells strongly like Elder tree (*Sambucus edulis*), above Dovan.
173. Beautiful young frond of *Cyrtomium anomophyllum*, approaching *C. macrophyllum*, but with teeth near pinna-apices and tiny, dark-centred indusia, forest above Dovan, 2700 m.
174. *Peranema aspidioides* (*Dryopteridaceae*, but *Peranema* is certainly not a *Dryopteris* as suggested cladonomically in China), sori like miniscule Christmas baubles, hanging below frond on tiny stalks, above Dovan.

175. *Vittaria* ("Haplopteris") *taeniophylla* (syn. *V. himalayensis*), elongated sorus submarginal, superficial, with no inner lip; when fronds are rolled up in dry weather, soak in a bucket of water before pressing as the sorus must be seen for identification, Dovan to Himalaya Lodge.
176. *Onoclea* (syn. *Matteuccia*) *intermedia*, fronds taper to base, dimorphic with very distinctive old fertile fronds with narrower, thick pinnae, Dovan to Himalaya Lodges, c. 2800 m.
177. *Onoclea intermedia*, tapering narrowed frond-bases.
178. *Onoclea intermedia* crown-rhizome, when not fertile can be mistaken for a *Dryopteris*.
179. *O. intermedia*, fertile pinnae, Dovan to Himalaya Lodges, c. 2800 m.
180. *O. intermedia*, like a lobed *Dryopteris dickinsii*, forest edge above Dovan, 2800 m.
181. *Deparia allantodioides*, light forest above Dovan.
182. *Polystichum piceopaleaceum*, dense forest above Dovan. Typical of section *Metapolystichum* (which includes *P. setiferum* of Europe).
183. *Polystichum piceopaleaceum*, pinnules and sori from beneath.
184. *P. piceopaleaceum* close-up of top surface.
185. *Polystichum piceopaleaceum*, with scattered black scales on stipe, and rounded-rhombic pinnules.
186. *P. piceopaleaceum*, frond showing typical pinnule-shape.
187. *P. piceopaleaceum*, pinnules and sori close-up.
188. *Lepisorus nudus*, fronds arise rather well apart in contrast to *L. contortus*, forest above Dovan.
189. *Lepisorus nudus* sori.
190. *Lepisorus nudus*, concolorous grey-brown rhizome-scales, above Dovan Lodge.
191. *Athyrium atkinsonii*, fronds well apart on rather thin creeping rhizome, pink stipe and rachis, above Dovan, 2800 m, young fronds are often used as a spinach.
192. *A. atkinsonii*, pinnules symmetrical about their axes, unlike in *A. fimbriatum*, with which it is often confused.
193. Terrestrial Helleborine Orchid, *Epipactis* sp., above Dovan towards Himalaya Lodge, c. 2800 m.

194. *Asplenium laciniatum* subsp. *tenuicaule*, more finely dissect pinnae with more stipitate segments than subsp. *laciniatum*, above Dovan, c. 2800 m.
195. Large *Polystichum nepalense*, forest above Dovan, c. 2800 m.
196. *Polystichum nepalense*, but pinnae becoming lobed, slightly towards *P. manmeiense*; it's worth checking spores of such plants in case they might be hybrids as I once found one that was in the west Indo-Himalaya. Something more complicated seems to be going on in this species!
197. Forest path, lined by *Dryopteris wallichiana* crowns, above Dovan, c. 2800 m.
198. "Hang on a sec!" "Oh no, not ANOTHER *%!@X*!* FERN-STOP!!". Fern-forest paradise (for the initiated!), above Dovan.
199. Polysticho-Dryopteridetum paradysicum! *P. longipaleatum* and *D. wallichiana*. Forest above Dovan, 2800 m.
200. Oh for a fern-garden like this one!!
201. *Cystopteris moupinensis*, a smaller relative of *C. sudetica* of Europe, above Dovan.
202. A mass of *Cystopteris moupinensis* on a mossy boulder.
203. *C. moupinensis* frond, above Dovan, c. 2800 m.
204. The minute *Asplenium capillipes* subsp. *capillipes*, small, crisp, dark-green fronds with acute lobes and some tiny proliferous bulbils on the lamina, base of mossy rocks above Dovan, 2800 m.
205. Ban Devi (Annapurna Forest Goddess) Mandir (temple) and prayer-flags, on path from Dovan to Himalaya Lodges.
206. *Lepisorus mehrae* (misapplied name: "*L. kashyapii*", nom. nud.), very superficial or aerial, thick rhizome, forest above Dovan, 2800 m.
207. *Lepisorus mehrae*, small brown laminar microscales beneath, jagged and with long, narrowly aristate, hair-like, zig-zag apices.
208. Young *L. mehrae* frond with hair-tipped frizzy, brown laminar microscales, before many of them drop off.
209. *Lepisorus scolopendrium* (Buch. Ham. ex D. Don) Ching, rhizome mostly on or within the substrate, laminar microscales darker, or black and without the long, crinkly, zig-zag, hair-like apices of *L. mehrae*, above Dovan.
210. *L. scolopendrium* laminar microscales, darker and without crinkly apices.
211. *L. scolopendrium*, the rhizome (here extracted) is attached within the substrate by thin and branched roots, not the stiff, bare stilt-roots of *L. mehrae* (sorry about the dodgy focus!).

212. *Polystichum neolobatum*, dense pinkish stipe-scales, smallish and rather narrow-fronded individual plant, very dense, broad stipe-scales, above Dovan.

213. *Polystichum neolobatum*, chance bifurcation of a frond, happens occasionally in many ferns, not of taxonomic or nomenclatural significance, above Dovan, c. 2800 m.

214. *Polystichum neolobatum* full-sized, Dovan to Himalaya Lodges.

215. Our party taking a rest-break at a *chautara* on the way to Himalaya Lodge.

216. Wild strawberry snack? - but these ones disappointingly had no taste at all, unlike the different species further down on the way.

217. The summit of Machapuchare Himal (6993 m) almost right over us now, above the snow-patched eastern valley ridge.

218. *Onychium cryptogrammoides* subsp. *cryptogrammoides* ("O. *contiguum*" sensu Hope, nom. superfl. for *O. lucidum*), pale stipe with blackish base, frond delicate, very foliose and three-dimensional, not flat as the pinnae are out of plane, near Himalaya Lodge, 2800 m.

219. The little-known *Adiantum wattii* (syn. *A. refractum*, *A. levingei*), like a high-altitude *A. capillus-veneris*, but rounded crenations on sterile segments or no teeth at all, many long sori, smaller basal and larger later fronds in some plants, near Himalaya Lodge, 2900 m.

220. *Adiantum wattii*, some sori can be very long, all around edge of lobe or segment.

221. *Adiantum wattii*, closer.

222. *Adiantum wattii*, typical habitat at base of overhanging rock, near Himalaya Lodge.

223. *Adiantum wattii*, young fertile frond, close-up.

224. A small *Adiantum pedatum*, fan-shaped frond, rounded segment-tips, Professor S.C. Verma's "pleasing green form" colour, as opposed to *A. myriosorum*, with grey-green fronds.

225. *Adiantum pedatum* segments.

226. *Adiantum pedatum*, close up of segments of a larger frond.

227. *Adiantum pedatum*, *A. wattii* and *Athyrium rupicola*, at base of a rock, Himalaya Lodge.

228. *Dryopteris* probably the rare *D. costalisora*, but it might perhaps only be a small *D. panda*, instead? Cytology can decide with a proper squash-count (diploid versus tetraploid), semi-open grassy path-bank near Himalaya Lodge.

229. Himalaya Lodge at the top of the forest zone, 2900 m.

230. Relaxing break at Himalaya Lodge, though more expensive to eat there compared to down below.

231. Route-map sign-board at Himalaya Lodge, commando-style route timings compared to our gentler ferny ramble!
232. Attractive young *Rhododendron* leaves, white beneath, near Himalaya Lodge.
233. *Aleuritopteris leptolepis* (misapplied name *Cheilanthes dalhousiae* auct., nom. rejic.), never has white farina powder beneath, above Himalaya Lodge, 2900 m.
234. *Aleuritopteris leptolepis*, no farina or scales beneath.
235. *A. leptolepis* under-surface, above Himalaya Lodge.
236. *Polystichum sinense*, white hairs and fibrils, narrow-based segments, an allotetraploid, half way between *P. piceopaleaceum* agg. and *P. prescottianum* agg., above Himalaya Lodge, 3000 m.
237. *Polystichum sinense* (syn. *P. wilsonii*), young fronds with whiteish scales and hairs, beside path above Himalaya Lodge, c. 3000 m.
238. *Polystichum sinense*, close-up of pinnae, covered in white fibrils.
239. *P. sinense* underside, pale scales and fibrils.
240. *P. sinense*, scales at stipe-bases.
241. *P. sinense*, attractive white-hairy young fronds coming up, above Himalaya Lodge.
242. *P. sinense*, young frond shepherd's-crook apex close-up.
243. The beautiful white-hairy young fronds of *Polystichum sinense*, all along path from Himalaya to Deurali Lodges, 3000 + m.
244. *P. sinense*, mid part of fully expanded frond.
245. *Polystichum centronepalense*, a new species, lower half of leaf, then only known from this locality, though not uncommon there about 3000 m, Himalaya to Deurali Lodges. I have now found that it was known under a later name (now synonymised) from S.W. China as well, so is not endemic to Nepal - a case of "temporary endemism".
246. *Polystichum centronepalense*, the first plant unexpectedly discovered by surprise.
247. *Polystichum centronepalense*, underside, pale brown scales, appears intermediate between *P. sinense* and *P. piceopaleaceum*?
248. *Polystichum centronepalense*, close-up of top-surface, Himalaya to Deurali Lodges, 3000 + m.
249. *P. centronepalense*, close-up of young sori and dense golden scales, beneath.

250. *P. centronepalense*, crown with scaly stipe-bases.
251. Avalanche and altitude-sickness warning notice above Himalaya Lodge. - very relevant to our trip!
252. An attractive *Euphorbia* (Spurge), which would grace any garden of cold climes. Species?
253. *Athyrium rupicola*, Himalaya to Deurali Lodge, 3000 m.
254. *Athyrium rupicola*, tapering frond-base and lobe-toothed pinnules.
255. Stand of *Athyrium rupicola* young fronds.
256. A petite Violet (*Viola*) growing on earth-banks. Species?
257. Sagun at Hinko Cave, Deurali, where the ancient Tibetan flying Tantric, Milarepa, meditated 3000 years ago, but no flying for us, we're still plodding along the path!
258. White *Cornus* species in flower.
259. The path to Deurali Lodge (behind), also the highest spot *Polystichum centronepalense* turned up among the rocks, 3200 m.
260. Chris F.-J. taking a short break near Deurali, with my 30-year-old Karrimor Karibou rucksack still going strong-ish, like its owner.
261. *Lepisorus clathratus*, a small, high-altitude lithophytic species growing among compact moss and rocks, with bluntish, or not very acuminate frond-apices and delicate, slightly succulent frond, Deurali, 3200 m.
262. *Lepisorus clathratus*, growing in on rock-crevices.
263. *Lepisorus clathratus* rhizome-scales - a bunch of the characteristic toothed, translucent, clathrate rhizome-scales are just above the green larger-leaved moss - important to clean moss and earth away from a herbarium specimen in all *Lepisorus*, where scales must be visible for identification. Clathrate means the cell-wall network is clearly visible, unlike in most other *Lepisorus*.
264. *L. clathratus*, plants with a slightly asymmetrical lamina-base and longer sporangial annulus (under the microscope) were renamed as *Platygyria variabilis* by Prof. Ren-Chan Ching, but in error. The type species of *Platygyria*, *P. waltonii* from Tibet and China, is merely aberrant populations of *L. clathratus* with fronds dividing into several "pinnae" and molecular over-interpretation is misleading.
265. Spectacularly carmine-red ground orchid, *Dactylorhiza hatagirea*, the "Panchaule" (five-fingered bulb), seriously threatened and depleted due to massive and still not controlled collection as a reputed aphrodisiac.

266. *Aleuritopteris grisea*, has a wrinkled upper surface, white farina beneath and dark-red, concolorous stipe-base scales and is confined to the high Himalaya, despite fanciful misidentified reports from central India, Bangladesh etc., Deurali 3200 m.
267. The superb *Cypripedium luteum*, yellow Himalayan Ladies' Slipper orchid, Deurali 3200 m.
268. Ice surface on the smaller of two main avalanche-debris ice-slopes to cross, this one just before Deurali Lodge; it melts until replenished by huge Summer avalanches from the high snow-peaks of Hiunchuli Himal a mile up above. Mind the holes and gushing stream beneath!
269. Deurali ice-slope surface - easy crossing in the morning.
270. Delightful *Primula* cliff, Deurali, 3200 m - Species? In the candelabra-flowered group.
271. The welcome haven of Deurali Lodge, with Machapuchare peak up behind it.
272. We are HERE, in case one didn't realise; sign-board map at Deurali.
273. Our party in the cold morning chill by upper Modi khola, setting out from Deurali Lodge, 3 June 2012.
274. CRFJ by rushing Modi khola river, below a steep ice-slope above Deurali.
275. Young fronds of *Deparia subsimilis* (syn. *D. acuta*), with elongated and lobed 1st acroscopic pinnules in the lowest couple of pinnae and many dark scales at the stipe-base, above Deurali.
276. *Deparia subsimilis* stipe-bases, above Deurali.
277. *Deparia subsimilis*, frond base.
278. *Pichisermollodes malacodon*, narrow teeth at margins, rocks above Deurali near ice-slope, 3200 m.
279. *Pichisermollodes malacodon*, above Deurali.
280. *Pichisermollodes malacodon*, close-up showing acute teeth which are sometimes very long-aristate.
281. *Pichisermollodes malacodon*, thinnish rhizome with brown scales, above Deurali.
282. Early morning sunbeams behind part of the summit of Machapuchare peak, above Deurali.

SET 3 PHOTOS:

283. Path alongside Modi Khola, with main avalanche ice-slope beyond us.
284. *Thelypteris* (*Pseudophegopteris*) *levingei*, thin creeping rhizome and narrow frond, a higher-altitude species, above Deurali, 3200 m.
285. *Thelypteris levingei*, close up underneath, showing white hairs looking like glass-spicules when seen under a lens.
286. Approaching the big avalanche ice-slope no. 2 above Deurali.
287. Starting the crossing, with hard ice in the morning, not so slippery, but still steep and a bit tricky.
288. Watch your step!
289. All across, just about...
290. White ground-orchid (?*Cephalanthera*?) beside the path.
291. Annapurna northern snow-peaks ahead and just another 4000 m above! On the far side of that to the north is the semi-arid, high-altitude rain shadow area of the Tibetan type in Mustang District, N. Nepal.
292. *Polystichum prescottianum*, a bit narrower than it can often be, pale, not mostly black scales in this clump, above Deurali, to Machapuchare Base Camp, c. 3500 m.
293. *P. prescottianum*, close-up of lower pinnae.
294. *Polystichum prescottianum*, lobe apices not terminating in a single pointed tooth.
295. *Dryopteris komarovii*, a lithophyte, with narrowly acute lamina- and pinna-apices, sticky-glandular, sweet-smelling fronds and distinct from the related *D. barbiger*.
296. *Dryopteris komarovii*, almost posing for its photograph, Deurali to Machapuchare Base Camp, 3500 m.
297. An old wall with *Woodsia andersonii*, *Polystichum thomsonii* etc., above Deurali, c. 3500 m.
298. The beautifully hairy, miniature *Woodsia andersonii*, how's this for a fern-gem?!
299. Another little gem of a fern, *Woodsia lanosa*; Dr. Naresh Thapa and I overlooked it while we were preparing his book on Nepal ferns (2002), near Machapuchare Base Camp, 3600 m.
300. A beautiful candelabra *Primula*, below Machapuchare Base Camp, 3500 m.
301. *Fritillaria cirrhosa*, a lot like European *F. meleagris*, but not it, M.B.C., 3500 m.
302. Inside flower of the Himalayan endemic *Fritillaria cirrhosa*.
303. Fritillary lilies, meadow below M.B.C.
304. *Pteris dactylina*, like a miniature and more radiate *P. cretica*, mossy rocks below M.B.C., 3500 m.
305. *Pteris dactylina*, below M.B.C.

306. *Pteris dactylina*, close up of toothed, radiate pinnae.
307. Cliffs above Machapuchare Base Camp, looking back on our path along the upper Modi khola river.
308. Path in white *Meconopsis* (Himalayan Poppies) meadow by small avalanche ice-patch, below M.B.C.
309. Woolly *Meconopsis* where ice has melted, below M.B.C.
310. Ah ha! - what have we here then? *Asplenium viride*? Oh, no, it's *Polystichum lachenense* - wonderful!
311. *Polystichum lachenense*, another fine little high-Himalayan gem, below M.B.C. 3600 m.
312. *Polystichum lachenense*, sori and few scales beneath.
313. *P. lachenense*, fully grown at c. 10 cm tall, below M.B.C., 3600 m.
314. *P. lachenense*, lower surface.
315. *Polystichum lachenense*, slightly larger and more lobed.
316. *P. lachenense*, sori, below Machapuchare Base Camp, 3600 m.
317. *Cystopteris fragilis* subsp. *kansuana*, I believe; a small, high-altitude taxon with fused apical pinna-lobes, making rectangular segments at the pinna-apex, small spiny spores of the subsp. *fragilis* spine-type, though not ripe in this specimen. Requires further study, bases of rocks below Machapuchare Base Camp, 3600 m.
318. *Cystopteris fragilis* subsp. *kansuana*, below M.B.C. I had noticed this for some years before concluding it must be the same as the Chinese subsp. *kansuana*.
319. *C. fragilis* subsp. *kansuana*, below M.B.C, 3600 m.
320. *Cystopteris montana*, a rare species, for long misreported in Nepal etc. in error for *C. moupinensis*, but this is the genuine article, below Machapuchare Base Camp, 3600 m.
321. *Cystopteris montana* in its habitat, finely dissect, deltate-pentagonal frond, very thin, creeping rhizome, below M.B.C.
322. *Gymnocarpium jessoense*, appears to replace *G. fedtschenkoanum* from C. Nepal eastwards, but was generally overlooked due to its rarity, below Machapuchare Base Camp, 3600 m.
323. *Gymnocarpium jessoense*, segments smaller and less rectangular, slightly more rounded, and rhizome scales not so prominent as in *G. fedtschenkoanum*, below Machapuchare Base Camp.
324. *G. jessoense*, below M.B.C.
325. Young fronds of *Athyrium mehrae* (not "*A. nephrodioides*"), fronds very tapering below, pinna-lobes not lobed at sides, not deeply cut to their bases, below Machapuchare Base Camp, c. 3600 m.
326. A small, exposed *Dryopteris zayuensis*, below Machapuchare Base Camp.

327. *Dryopteris zayuensis*, makes perfect crown-shuttlecocks, below M.B.C.
328. *Dryopteris zayuensis*, showing dense and slightly wide black lower-rachis and stipe scales, many pale fibrils on pinna-costae.
329. *Selaginella helvetica*, like a small *S. pallidissima* at higher altitude, below M.B.C., 3600 m. It has recently been suggested by X.C. Zhang et al. in China from very doubtfully significant sequencing of unclear difference and adjacent position, to be a separate species, *S. jiulongensis*, but without testing Indo-Himalayan material. No significant morphological difference was shown at all and this appears merely to be over-zealous attribution of taxonomic importance to slight molecular variation in a widespread species. Lack of taxonomic knowledge outside China also led the authors to map the possible "species" ranges quite pointlessly from areas of Kashmir, Pakistan etc. where they do not occur, by guesswork, with a completely incorrect and much wider supposed distribution also for the related *S. pallidissima* and others, rather than learning the species and their precise distribution in India, Nepal etc. They also attempted to separate another actual synonym, *S. laxistrobila*, from Nepal. This sort of guesswork based on some uninformed sequencing is far too commonly substituted for genuine knowledge by taxonomically limited molecular biologists. *S. jiulongensis* and *S. laxistrobila* are both just *S. helvetica*.
330. *Selaginella helvetica* has long, tall erect fertile strobili later in the season, below M.B.C., c. 3600 m.
331. *S. helvetica*, close-up, not mentioned for Nepal by Thapa and I in his Nepalese fern book (2002), earth banks below M.B.C.
332. Pink-flowered shrub, below Machapuchare Base Camp, 3600 m.
333. *Athyrium attenuatum*, related to *A. filix-femina* of Europe, but dark scales and pinnules not so sloping and more sessile; pinnules become more lobed and toothed in larger specimens (forma *dentigerum* growth-form), below M.B.C.
334. Snow-patch waterfalls below Machapuchare across the Modi Khola valley to the south.
335. Approaching Machapuchare Base Camp lodge, where the route turns west up to the Annapurna cirque.
336. Thirsty? - a lovely ice-cold, clear trickle out of the ground, no houses above, so no problem below!
337. Crossing the side-stream from Annapurna cirque, Machapuchare Base Camp, 3700 m.
338. Hey, this ladybird is a different colour from the others!
339. The mysterious black spikes of an *Arisaema*, or Cobra Lily, "*Lali*", Machapuchare Base Camp, 3700 m.
340. *Lali* spikes seem to be emerging from some subterranean world.
341. The *Lali* then begins to burst into black leaves.
342. *Lali* leaves and flowers, the leaves are gathered in quantity as a spinach-vegetable, or *sag*.
343. I wonder if there's really a mouse inside that flower with its tail sticking out??

344. Porters with amazing strength and endurance overtake us easily, carrying heavy planks by head-band and neck-muscles all the way up to Annapurna Base Camp for building, at 2000 rupees (15 pounds sterling) for each 3-day trip.
345. Porter and 100 kilo load (or more) heading up into the clouds and a view up towards the Annapurna cirque; snow-leopard country above M.B.C. at 4000 m and up.
346. *Cryptogramma stelleri*, with *Polystichum lachenense*, above Machapuchare Base Camp, 3900 m
347. *Cryptogramma stelleri*, sterile and fertile fronds above M.B.C.
348. *Cryptogramma stelleri*, sterile fronds, close up.
349. Jacob and remarkable croziers of *Dryopteris barbigera* having a look around after their Winter-sleep, the large, bright-green adult leaves in a few weeks' time have an abrupt, blunt to subtruncate frond-apex and pinna-apices and a densely with russet-scaly stipe and rachis, by path above M.B.C. to Annapurna Base Camp, 4000 m. Lali growing behind.
350. They'll soon be as tall as Jacob (was)! Adult fronds with blunt to subtruncate frond-apices, stickily glandular and orange-scented.
351. Russet-scaled croziers and old dead fronds of stands of *Dryopteris barbigera*, in open meadows and grassy slopes, above Machapuchare Base Camp, 3800 m.
352. View down from above Machapuchare Base Camp, 3800 m.
353. Cliffs looking back down upper Modi khola valley and hail-storm blowing up from Machapuchare Base Camp.
354. View north into northern Annapurna peaks and clouds.
355. Another small, very fibrillose *Polystichum*, *P. shensiense*, pinnule-apices are single-toothed points, among rocks above M.B.C., 3900 m.
356. *Cystopteris fragilis* subsp. *diaphana*, with many veins terminating in notches and others in flat lobe-tips, densely blunt-spinulose spores (on the one ripe frond found), above Machapuchare Base Camp, c. 3800 m.
357. *Cystopteris fragilis* subsp. *diaphana*, not previously known as far east as Nepal, though present in Pakistan and Kashmir.
358. Inside the great cirque at Annapurna Base Camp in the morning, 4100 m, the view we missed due to the clouds and altitude-sickness; photo by Courtesy of Summit Treks and Adventures, Chhetrapati, Kathmandu (Statreks@wlink.com.np).
359. Annapurna Base Camp with Machapuchare peak behind across the valley, showing the north ridge climbed by Wilfred Noyce to about 50 m below the deliberately unclimbed sacred summit. It looks cold in A.B.C.! Photo by Summit Treks.
360. View down across the snowfield in the great Annapurna cirque in Winter, to Machapuchare. Dig-site for ferns? I bet they are interesting, though under the snow then! Photo by Summit Treks.
361. Ancient ??Sedum plants above Machapuchare Base camp.

362. Cliffs on the way back down to Deurali Lodge, a place for an invigorating cold-shower, anybody? But with the occasional stone.....
363. After Sagun recovered on coming down to lower altitude, Deurali Lodge and trekkers at table - at least we could afford the local tomato-ketchup, if not a lot else!
364. A tiny white flower of elaborate beauty. Any ideas what it might be? Forest near Bamboo Lodge, 4 June 2012.
365. *Dryopteris conjugata*, half way between the simply pinnate *D. hirtipes* (and *D. atrata*) group and the pinnate *D. wallichiana* complex; Professor Mary Gibby (1985) found it to be a diploid apomict, but no-one knows the origins and what are the original sexual diploids from these two sections, *Hirtipedes* and *Fibrillosae*. So much to research still in Asian ferns - and so few really doing so properly.
366. *Dryopteris conjugata*, dense, very narrow, black scales and pinnae lobed to half their depth, Bamboo Lodge down to Sinuwa, 5 June 2012.
367. White ?*Habenaria* ground-orchid and old leaf of *Dryopteris wallichiana*.
368. Young plants of the abundant annual *Selaginella chrysocaulos*, growing again from tiny bulbils produced at the tips of dying old lower branches that become the basal bulbil of the next year's plant, near Sinuwa, 2300 m.
369. *Polystichum neolobatum*, beautiful dense russet scales on the young frond stipes.
370. *Aleuritopteris albomarginata*, the commonest rather higher-altitude Silver Fern, basal late Autumn-grown fronds are smaller and with white farina beneath, but the large Summer monsoonal fronds usually have almost no farina, but scales beneath the pinna-costae distinguish it.
371. *Aleuritopteris albomarginata*, with its characteristic costal scales, though often only present very sparsely in the powder-less Summer fronds.
372. The rare little *Pichisermollodes nigrovenia*, darkened veins on the underside, short, non-acuminate marginal teeth and a thin rhizome with darkish brown scales, rather higher-altitude, from Bamboo Lodge down to Sinuwa, c. 2500 m.
373. *Pichisermollodes nigrovenia* and its darkened veins.
374. *P. nigrovenia* rhizome and scales.
375. *P. nigrovenia*, short marginal teeth unlike the rather similar *P. malacodon*.
376. *P. nigrovenia* close-up, characteristic veins and small teeth.
377. *Pichisermollodes quasidivaticata* (syn. *Crypsinus stracheyi*), near Sinuwa. it has a thin rhizome with brown scales and the acute-pointed lowest and uppermost pinnae point back and forward, respectively.
378. *Pichisermollodes ebenipes* on old tree, has a thick rhizome covered in glossy black scales.
379. *Botrychium lanuginosum*, fertile spike arises between the first and second pair of pinnae, lowest pinnae deltate, unlike the oblanceolate ones of the very rare *B. virginianum*. Unnecessarily treated in Japan in an over-split cladogenus, *Botrypus* (or *Japanobotrychium*).

380. *Botrychium lanuginosum*, here and there on path-banks, and not uncommonly as an epiphyte on moss-laden tree-branches.
381. Shallow cave by path below and near Bamboo Lodge, the only site so far in Nepal for the newly found *Athyrium mengtzeense*, also discovered by CRFJ above Dodhray, Darjeeling, otherwise only in China and not known in Tibet.
382. *Athyrium mengtzeense*, one of only three plants seen, Sinuwa to Bamboo Lodge.
383. *Athyrium mengtzeense*, related to *A. roseum*, but densely glandular axial junctions and less lobed segments, stipe-base scales black. Spores good, not abortive, so not a hybrid despite the reddish-brown sori, which sometimes suggest possible hybridity in *Asplenium* etc.
384. *Athyrium fimbriatum*, reddish axes, often mistakenly called *A. foliolosum* in the past, including by Hope, as one of his "red-footed" (stiped) ferns, thick horizontal rhizome with fronds at apex.
385. *Athyrium fimbriatum*, asymmetrical pinnules (longer acroscopic lobes than basiscopic ones), unlike the higher-altitude *A. atkinsonii*.
386. Attractive geometrically patterned leaves of an unidentified low-growing pathside weed.
387. Sunil, our hero Brahman porter, on steps down to the bridge that got washed away two or three days later by a heavy pre-monsoon storm, with Chomrong on the opposite slope, as we leave Annapurna Conservation Area core-zone.
388. *Dryopteris chrysocoma*, fronds more erect than the related *D. woodsii*, scales all pale, sori more numerous, taller and more crowded and higher-altitude, above Chomrong, c. 2000 m.
389. *D. chrysocoma*, stipe with broad, pale scales.
390. *Dryopteris chrysocoma*, many button-like sori, with thick surrounding indusia (similar to those of *D. cochleata*, but fronds quite different).
391. *Dryopteris chrysocoma* sori, they will turn grey, then brown on maturity and do not shrivel up, even when the frond has died and turned brown.
392. The Treble Silverstripe butterfly, with help to identify it from Dr. Colin Smith's Nepalese butterfly books and his comprehensive butterfly collection at Pokhara Museum.
393. The Treble Silverstripe obligingly opening its wings for a portrait.
394. A beautiful iridescent Lycaenid butterfly, a rather common little "Blue", males with blue-mirror effects, females drab as they forgot to bring their make-up kits when they changed!
395. A very common intense-blue, pathside pea-flower.
396. *Pteris kathmanduensis*, non-apiculate segment-apices, free veins, more than one developed pinnate basiscopic pinnules on lowest pinna, glossy stipe and rachis.
397. *Pteris kathmanduensis*, rounded, non-apiculate (non-muricate) segment-apices and usually no setae above segment-midrib (top surface), above Chomrong, 2070 m.

398. Serene Machapuchare peak in a cloudless sky from Chomrong; Sinuwa Lodge just visible at bottom of picture.
399. Steps down to Khyumrung khola stream, where the *Tectaria morata* grows, 6 June 2012.
400. *Onychium lucidum*, often misidentified as "*O. japonicum*", showing its well separated fertile ultimate segments and stiff frond. It is hexaploid, unlike *O. japonicum* (not present in India) and *O. vermae*, which are both tetraploid.
401. Please mind the ferns during kick-boxing practice! - though it's only a colony of the ubiquitous lower-mid altitude *Thelypteris* (*Christella*) *procera*.
402. *Thelypteris* (*Christella*) *procera* (syn. *C. appendiculata*, *T. appendiculoides*), the most common of the creeping rhizome'd species in Nepal and the Indo-Himalaya, all with only one pair of veinlets anastomosing below each interpinnular sinus, confused badly in northern India with *T. parasitica* (South India), but lowest pair of pinnae not the widest part of the frond, and hairs longer and thicker. Birethanti roadside, 1000 m, 6 June 2012.
403. *Thelypteris* (*Christella*) *procera*, somewhat narrowed lamina-base, narrow and deeply cut pinna-lobes with obviously longer pale hairs beneath than in other species, forms large colonies in more open, often secondary places, Birethanti.
404. *Thelypteris procera*, long white hairs occur on all veins and midribs beneath the lamina; reknowned in Nepal as causing soreness or redness of softer areas of skin in some people; is also a clothes-moth repellent if dried fronds are placed beneath clothes in drawers.
405. *Thelypteris procera*, with slightly darker scales at stipe-base.
406. Real *Thelypteris* (*Christella*) *parasitica* for comparison (far N.E. India (only one collection), Bangladesh and South India), from Khao Yai Hill, Nakhon Nayak, C. Thailand, cult. outside in Kathmandu by CRFJ.
407. Real *T. parasitica*, Thailand, cult. in Kathmandu, creeping rhizome, long lowest pinnae, hairs beneath lamina not as long and softer than in *T. procera* and minute orange glands present on veins.
408. *Thelypteris* (*Christella*) *clarkei*, Deurali, Gorkha, Nepal, on way back to Kathmandu; also confused with *T. parastica*, but narrower bases to the lower pinnae, very short insignificant hairs beneath and thicker, short horizontal rhizome.
409. *Thelypteris clarkei*, Gorkha.
410. *Dryopteris woodsii* in full growth, a lithophyte, prefers small cliffs, smaller and more delicate, pendent fronds than *D. chrysocoma* and has a number of small, linear black scales on upper stipe and rachis, though these are often deciduous, New Bridge.
411. *Dryopteris woodsii*, showing flatter sori and narrower scales. A lower-mid altitude species, unlike *D. chrysocoma*.
412. *Dryopteris woodsii* stipe with many dark, narrow scales.
413. *Dryopteris woodsii*, unlike *D. chrysocoma* dying off first thing in the dry Winter period and dead fronds typically hang from the rock-surface, near New Bridge, 1500 m, photographed in dead state, November 2006.

414. The Dark Blue Tiger Butterfly, identified from Colin Smiths books.
415. I think this rather large moth is one of the Owl Moths (?*Cometaster* sp.), c. 7 cm across.
416. *Trichomanes* (*Crepidomanes*) *campanulatum* (syn. *T. insigne*), another fairly common species, usually smaller than *T. latealatum*, and with small dark hairs on the stipe-wing, near New Bridge, 1600 m.
417. The rare (in Nepal, abundant in the Khasi Hills, Meghalaya, N.E. India) *Aleuritopteris subdimorpha*, thick, black stipe with concolorous, reddish scales and a shorter, widely deltate lamina, near New Bridge, 1600 m.
418. *Aleuritopteris subdimorpha*, bright white farina beneath, New Bridge.
419. *A. subdimorpha*, concolorous reddish stipe-base scales, sometimes apices may be darker, but no dark centre in the scales, except right at the stipe-base, by the rhizome.
420. *Polystichum annapurnicola*, another new species, discovered by CRFJ in a few places in C. Nepal; above New Bridge, plant cultivated for several years in Kathmandu by CRFJ, and now chromosome-counted by Dr. Sadamu Matsumoto, Tsukuba, and found to be diploid, endemic to Nepal, as so far known - a rare category indeed - and one of only two ferns endemic to the country. But I expect it will turn out to be a "temporary endemic" that could perhaps turn up from Tibet to Myanmar.
421. *Pteris kathmanduensis*, a new species near to *P. aspericaulis* discovered by CRFJ in Kathmandu valley, but now known to extend from Uttarakhand to N.E. India, large, subapiculate to non-apiculate segments, smooth stipe, no setae above segments, Khyumrung khola to New Bridge, 1600 m.
422. *Pteris kathmanduensis*, close up of lower pinnae.
423. *Pteris kathmanduensis*, non-apiculate to subapiculate segment-apices; in the complex *Pteris aspericaulis* aggregate with some tendency towards the *P. biaurita* group.
424. Chestnut Tiger butterflies congregating to take salt from a urine patch (Not Guilty, M'lud! T'was but a passing buffalo...).
425. Jacob's Chestnut Tiger, picked up by hand from the feeding flock and temporarily held to behold the wonder of butterflies, then set free.
426. The less common Himalayan Map butterfly, settled for only a moment after much stalking - no wonder Jacob got a bit lost after Chomrong with charts like those!
427. The Indian Fritillary butterfly, on the invasive American *Bidens pilosa* plant (Nepali: *kuro*, whose seeds hook on everywhere); below, Kyumi, 1300 m.
428. Jacob and Sunil at Siwai, loading our rucksacks for an easy (if bumpy) ride down to the main road.
429. CRFJ photographing a big *Pteris vermae* again (same plant as photo 7), near Birethanti village; the poisonous *Thelypteris* (*Christella*) *arida* also present in a wetter area on the right of the photograph.
430. Sagun crossing the last bridge at Birethanti, where the Ghorepani trek heads off westwards towards Dhaulagiri Himal, nearly reached the main Pokhara road at Naya Pul.

431. CRFJ at the end of the trek Birethanti.
432. The small delicate *Oeosporangium* ("Cheilanthes") *tenuifolium*, grows on open, dry compact-earth slopes, very difficult to transplant and grow and may perhaps have a mycorrhizal association, Birethanti.
433. *Oeosporangium tenuifolium*, early Summer growth.
434. Rocks dried up until the monsoon below a seasonal waterfall at Komale, below Deurali, Gorkha, diverting off the way back from Pokhara to Kathmandu, 7 June 2012. Apart from the simple-fronded *Leptochilus decurrens* subsp. *decurrens* in the middle, where is the other fern visible here?
435. All over the rock-surface! The tiny *Trichomanes* (*Gonocormus*) *parvifolium*, the site of its first discovery in Nepal or India (only because of unknowingly sitting on it while cooling off under the small waterfall in the Summer monsoon).
436. *Trichomanes parvifolium*, c. 5-6 mm tall, with sori at some of the apices, is not a liverwort, Deurali, Gorkha, 700 m
437. *Selaginella bryopteris* in dried pre-monsoon condition, all along steep rock and earth banks beside the main road in gorge south of Mugling, from Narayanghat, way back from Annapurna, 7 June 2012.
438. *Selaginella bryopteris*, on a plate in dried-fried state from the hot sun.
439. *S. bryopteris*. Add water, wave a magic wand and wait for it - and back to life it comes. A "resurrection plant" - Now that's what I call magic!
440. A splendid "super-butterfly", the Blue Pansy, to welcome us home to Kathmandu in our little front-garden.
441. CRFJ, Jacob and Sagun in the cold-desert rain-shadow zone just north of the Annapurna massif, in Mustang District, by the northern border of Nepal. Only high-altitude ferns occur here, but often very interesting and rare species.
