

“*Meconopsis grandis* and its allies”

Chris Grey-Wilson

(written up by Evelyn Stevens and approved by Christopher Grey-Wilson)

Chris started the first of his two talks with an explanation of the nature of taxonomy and of some of the concepts involved which are particularly pertinent in the study of the genus *Meconopsis*. This would be valuable as he finds that people are often confused about what taxonomy is and what purpose it serves. It is a science – maybe it often seems to be imperfect, but we are dealing with the complexity of the living world. He has found that in the genera he has studied that species often fall into two types: (1) those that are easy to define, these often native to a small area of distribution, and (2) those that are more amorphous, often from a large area of distribution where it is often much more difficult to separate and define the different ‘species’. William Stearn said to Chris once, “If 90% of your specimens fit into your definition of a species, don’t worry about the other 10%.”

What do taxonomists try to do? They try to produce order from chaos. They do this by defining species (or whatever the taxonomic level is they are considering), then circumscribe (define) the species (or genera etc) and then classify them.

What approaches are used to do this? The best by far is a multi-disciplinary one; however, as far as *Meconopsis* is concerned, very little so far has been done on palynology (pollen analysis) or DNA. Most work is based on the morphological characters of the plants involved. Some taxonomists are “lumpers” and George Taylor was one, and others tend to see significant differences and so split up what the “lumpers” see as single entities. Since George Taylor’s time a lot more material has been acquired from the wild and these days photographs have been a big boon, especially with the advent of the digital camera, one of the finest tools for the field botanist. Chris has 5000 images of *Meconopsis* in the wild which people have kindly sent him. However, one disadvantage of modern plant exploration is the fact that countries often prohibit the collection of specimens and seed. A disadvantage of photographs is that you also do need specimens in order to be able to describe new and interesting taxa – you can’t do it based on photographs alone.

DNA studies are all the rage now; it is relatively easy to get funding to do DNA research, but almost impossible if you want to tackle traditional taxonomy at research level. Also the techniques used in DNA studies are expensive and time-consuming, and to be of value you do need a lot of samples and correct determination of any material used. Such approaches may produce much valuable information in future, but he concluded that in the meantime taxonomists can’t get away from the need for basic morphological research, after all we still have to identify species by eye.

Chris then started his Powerpoint presentation by listing the people who had given him photographs. He now has photographs of nearly all species of *Meconopsis* in the wild – exceptions are *MM. torquata* (near Lhasa), *violacea* (Myanmar), *venusta* (to be distinguished from *pseudovenusta*), *smithiana*, *oliverana*, *chankheliensis*, and *taylori* (around Annapurna). Chris would welcome information and/or photographs of these.

With the aid of diagrams, Chris then explained a number of taxonomic concepts particularly relevant when studying *Meconopsis*. *Meconopsis* often displayed what he described as “incredible variation”. This applied to the species he was discussing in both talks at the present meeting. He illustrated this point with very varied pictures of plants which once, before he started working on *Meconopsis*, were all regarded as *M. integrifolia*. He showed a picture of true *integrifolia* with upright goblet-shaped flowers, which occurs in north and western China, and eastern Tibet, then as you go south in China and west into Tibet, you encounter a closely related species *M. pseudointegrifolia* with nodding flowers and a different leaf venation. For both, with increasing altitude, but without disjunctive breaks, the plants become dwarfer. We don’t yet know if the dwarfness is genetic or purely an environmental effect. You can also get different colour forms, e.g. a pale form of *pseudointegrifolia*.

Continuing on the topic of variation, his next point was to explain, with a diagram, the concept of a cline. This phenomenon is common in some plants, such as within the genus *Meconopsis*. In contrast to clines

are distinct taxa. In the case of distinct taxa there are distinct and easily appreciated differences in characters between closely related species. But in clinal taxa, there is a gradual change in morphological characters between one extreme and the next making easy separation tricky. A good example can be found in *Cyclamen*. *C. pseudoibericum*, *C. cypricum* and *C. libanoticum* are three distinct eastern Mediterranean taxa (species) each occupying a distinct geographical area and without overlapping characters, yet they are clearly closely related. However, *Cyclamen coum* is an excellent example of a clinal taxon, as there is a gradual change in characters across its wide distribution from eastern Europe to Turkey east to the Caucasus. In the west, the plants (often known as *C. coum* subsp. *coum*) have rounded leaves only and white-nosed flowers, while at the eastern end of the distribution (often known as *C. coum* subsp. *caucasicum*) plants have heart-shaped leaves and flowers with a pink nose. In between these two extremes there is a gradual transition of characters; the further east you go, the more likely you are to find the heart-shaped leaves, pink-nosed flower forms.

Subspecies were also referred to. This is a term and concept that is perhaps less favoured by taxonomists at the present time than previously. Subspecies have been defined by taxonomists as regionally or ecologically distinct forms of a species, normally kept separate from one another by geographical location or by the ecological niche occupied, this resulting in them being morphologically distinguishable. But they are not usually genetically isolated and therefore continuous intergrading/interbreeding between them is possible. As a result, a clinal interpretation of the variations seen when a species occurs over a wide area of distribution probably reflects the actual situation more than does a subspecific concept.

Continuing the topic of variation, Chris then explained the concept of “species associations”. This concept recognises the situation in which a *group* of species are particularly closely related, linked by a series of characters; some botanists may regard them as a *single* species. Some of these entities are so similar to the “main” species that they are regarded as being “embedded” within it. With similar reasoning, rather less similar species are taken to be not embedded in the main species.

Having discussed some taxonomic topics particularly pertinent to *Meconopsis*, Chris then went on to review “*Meconopsis grandis* and its allies”, the main subject of his first talk. He started by showing Taylor’s classification of Subsection Cumminsia which includes Series *Simplicifolia* and Series *Grandes*. The plants he spoke about were *MM. integrifolia*, *pseudointegrifolia*, *betonicifolia*, *baileyi* and a few other rare species in Series *Grandes*, and *M. simplicifolia* in Series *Simplicifoliae*. In his slides Chris labelled some of them with the species name only, but in others he added the qualifying terms “*sensu stricto*” and “*sensu lato*”..

On the slide which showed Taylor’s classification, he pointed out some new species that had been added, one from Paul Egan (Series *Robustae*), 4 from Toshio Yoshida (Series *Aculeatae*), several that he had added himself including *MM. tibetana*, *simikotensis*, *chankeliensis*, *ganeshensis*, *staintonii* and *wilsonii* and possibly a few others that he himself needed to sort out. He also said that the Taylor classification may need to be modified; for example the close relationship between *M. simplicifolia* in Series *Simplicifoliae* and those in Series *Grandes*, which includes *M. grandis*. The two Series vary in very few characters, mainly that *Grandes* species have a whorl of leafy bracts part way up the stem, this being absent in *M. simplicifolia* which is scapose (flowers arise on simple stems straight from the basal leaf rosette).

The first set of plant pictures then shown were *M. integrifolia*, *sensu stricto*, characterised by goblet-shaped, up-facing flowers arising from a leafy whorl part way up the flowering stem, in Sichuan and in a pass going into Tibet. It is very uniform with a wide distribution – the whole of Qinghai, Gansu, W & N Sichuan, as far south as the Yulongxueshan by Lijiang. The next slide was a diagram of an altitudinal cline. One normally thinks of a cline with an east-west or north-south progression, but there can also be gradual changes with increasing altitude, and this applies in both *M. integrifolia* and *pseudointegrifolia*. Chris showed pictures of dwarf ecotypes from high elevations. The flowering stems of these are short, and the whorl of leaves occurs low down and is often partly obscured by the basal leaf-rosette. There are also colour variants, including a cream one.

Chris then showed as in a previous talk the marked differences between the fruits of *MM. integrifolia* and *pseudointegrifolia* – a large wide stigma on top of the ovary and with no, or a very short, style in *integrifolia*, and a distinct style and smaller stigma in *pseudointegrifolia*.

He then showed pictures of some pressed specimens of *M. integrifolia* sensu lato and emphasised the value of such material, when well prepared, and especially if they were also well annotated by the collector with details of the plant and its habitat and with variation or distinctive features observed.

The next species to be discussed was *M. simplicifolia* in Series *Simplicifoliae*. *M. simplicifolia* has a wide range from central Nepal to Bhutan and adjacent areas of Tibet, but it does not occur in China, or in the extreme western or eastern Himalaya. It is incredibly variable, this presumably reflecting its wide distribution. The flowers are large (up to 17 cm diam.), and it has a basal rosette of leaves from which up to 9 scapes can arise, each topped with a single flower. The flowers may be pure blue, lavender blue or purplish blue. It differs from *grandis* in a number of ways: it lacks the whorl of leaves on the flowering stem, while the flowers themselves have a large number of petals (up to 9 or 10), and the filaments are same colour as the petals. It also has a very distinctive fruit. It ranges in height depending on habitat. It can be quite dwarf in exposed situations (25-30 cm) or it can be up to 80 cm tall. It grows in open situations or in open woodland or on shady banks. It has nodding or semi-nodding flowers. The best forms seem to come from Bhutan – this applies to several other species of *Meconopsis* including *MM. grandis*, *horridula* and *paniculata*. The reason for this is unknown. *M. simplicifolia* is now quite rare in cultivation – for some unexplained reason, for it was formerly far more widely grown.

Chris next showed several species that have apparent similarities to *M. simplicifolia*. Two of them he felt confident about identifying were *M. zangangensis* (this seems to be perennial and it has a whorl of leaves on the flowering stem, so it cannot be a member of *Simplicifoliae* as at present conceived) and *M. nyingchiensis* (the latter has tri-nerved leaves and an unusual ovary and stigma; there is no style).

The main section of the talk followed. This was on the *M. betonicifolia/baileyi* complex. Chris has studied this over a number of years. A brief history is that *M. betonicifolia* was described in China in the late 1890s. It was never brought into cultivation. Colonel Bailey and Frank Kingdon Ward and others found and collected another blue poppy in Tibet which was called *M. baileyi*. When George Taylor's book was published, he lumped the latter into *betonicifolia*, the Chinese species being the earlier name. Then no-one looked at it until Chris did so, when he realised that the two could be separated on quite a few characters. (Of course others may consider them to be subspecies but that is a taxonomic decision that can only be made by individuals after weighing up all the data.) The result is that everything in cultivation now has to revert to being called *M. baileyi*. *M. betonicifolia* is not in cultivation in this country, but it is in Canada. Hybrids have been made between the two, but these are inferior. Chris made the point that it is important to keep wild material plants isolated and so keep them pure in cultivation.

It is clear that both species are perennial in the wild. In cultivation *M. baileyi* is a biennial or short-lived perennial and Chris is not sure why: but it is probably that they are not able to withstand the high summer temperatures of the more southerly counties of England. Chris said he knew that I (Evelyn Stevens) had a clump which is 18-20 years old (I actually have plants much older than that and this longevity applies to a number of plants and is the norm in my garden in central Scotland, the plants forming sizeable and divisible clumps). Chris showed some pictures of different forms of *baileyi* in cultivation including the well known white form.

Chris then continued by talking about *M. betonicifolia*, showing slides of both pressed specimens and photographs of the plant in the wild. This species comes mainly from Yunnan and just peeps across that border into the hinterland of Tibet along the Yunnan/ Burma border. It also just gets into Sichuan. He showed a slide of a table he had compiled and published in *The Alpine Gardener* showing the differences that justify the separation into two species. This is reproduced below. He said that the table will be amended slightly for the monograph. He also said that he thought it was "probably the right decision to split them up". He commented that a lot of the objections to changes in plant names, is that people just don't like such changes to familiar plants, rather than objecting on taxonomic grounds which is the only valid reason for such changes.

	<i>M. betonicifolia</i>	<i>M. baileyi</i>
Provenance	Yunnan	S.E. Tibet
Habit	Stoloniferous	Non-stoloniferous
False whorl	Absent	Present
Mature leaf lamina base	Cordate to truncate	Broad-cuneate to subtruncate
Mature basal leaves-marginal teeth	5-9 pairs	8-13 pairs
Mature basal leaf dimensions	65-135 x 28-67 mm	152-280 x 54-116mm
Style length	5-9mm	+ or - obsolete - 3.5mm
Stigma length	3.5-5.5mm	3-4mm
Fruit capsule pubescence	Glabrous (maybe a few bristles on the sutures)	Moderately to densely bristly
Fruit capsule size	25-33 x 8-9mm	(26)28-40 x 10-14mm

With the aid of slides of pressed specimens and photographs of plants in the wild, he discussed the most important differences between *baileyi* and *betonicifolia*.

- i) Unlike *baileyi*, *betonicifolia* is definitely stoloniferous, with stolons 20-30 cm long, sometimes almost growing in water. This has only been recently appreciated – by a number of different observers.
- ii) The flowers are borne alternately in the axils of leaves (bracts) at the top of the stem. This is in contrast to *baileyi* where the flowers are mostly borne in a cluster within a false whorl of leafy bracts at the top of the stem, although in the latter, small flowers may occur below the main cluster. This “baileyi condition” also applies to many of the big blue poppy hybrids in cultivation.
- iii) The fruits differ too. *M. betonicifolia* has a much longer style and the capsule is narrower and usually glabrous (occasionally it has a few hairs near the base), whereas it is bristly in *M. baileyi*. The capsule also differs in shape from *baileyi*, the latter being proportionately broader, yet shorter. The maturing or mature fruits are very useful in defining these two species as is the case with many other species of *Meconopsis*.

Turning to *M. baileyi*, this is found far to the west in SE Tibet. It has been collected on many occasions. There exist plenty of herbarium sheets and Chris showed slides of 4. Both pressed specimens and photographs of plants taken in the wild show quite a lot of variation. Chris showed 9 pictures of what he labelled *M. baileyi* sensu lato. These were pictures taken only last summer by Harry Jans and John Mitchell who noted quite large variations in the plants from two distinct sites fairly near to one another in Tibet. At one site it looked as though they *could* perhaps be stoloniferous, and Chris commented that the plants in these sites need to be looked at further and he hopes to be able to go himself, to see them, next year.

He also showed slides of *M. baileyi* forma *pratensis* (‘Pratensis’) in cultivation. He said that we don’t know if this is the same plant as that described by Frank Kingdom Ward, because there is no pressed herbarium material to compare it with. Frank Kingdom Ward thought *pratensis* was a form of *baileyi* and

said that it grew in open situations and not in woodland. The slides showed the leaves with the typical shape of *baileyi* leaves and the tufting of the leaves at the point at which the flowers arise. (Point added by Evelyn whose pictures Chris showed: the fruit capsules are typical of *M. baileyi* (in shape and bristles), but, unlike “normal” *baileyi* in cultivation, it is sterile).

The last form of *M. baileyi* Chris showed was slides of a plant raised by Ron McBeath from seed collected in Assam (Arunachal Pradesh) and flowered by Evelyn and others in recent years with rather pale flowers. It appears not to have persisted in cultivation..

The next species to be discussed was *M. grandis*. This distribution range is primarily from the Arun Valley in Nepal eastwards into Sikkim, Bhutan, Arunachal Pradesh and SE Tibet, but there is also as a very isolated outlier in western Nepal. Chris said that there are many modern photographs of *grandis* in Nepal and the adjacent areas, but none at all from Bhutan. It seems that none of the trips to Bhutan in recent years have seen it. But this year Martin Walsh and others are going to the very area in NE Bhutan where *M. grandis* was seen, photographed and collected (seed and herbarium specimens) and from which it was introduced into cultivation by Ludlow and Sherriff. Chris showed slides of some of their fine and well-annotated herbarium specimens of the plants with their large flowers. It has huge, wide leaves, bristly fruit capsules and usually 4 petalled flowers, sometimes more. Clearly some of the hybrids in cultivation are based on this form, although more investigation is needed to confirm this. He then showed slides taken by Anne Chambers right on the Arunachal Pradesh/ Bhutan border (they were slipping in and out of Bhutan where they saw the plants photographed, not far from where Ludlow and Sherriff explored). These pictures showed the features just described for the herbariums specimens collected by Sherriff. Chris concluded that these features apply to the Tibetan, Bhutanese and north-east Indian forms of *M. grandis*.

Chris then went onto the form of *M. grandis* as it occurs in east Nepal and Sikkim. It is very similar in many ways, but it has much longer, thinner fruit capsules which are glabrous, or almost glabrous (sometimes there are some bristles), the style is longer and the leaves are much narrower and more pointed. Chris pointed out, with a picture, that the fruit is very different from *simplicifolia* with which it has been confused in the past (the latter is broader above the middle and very bristly). *M. grandis* grows in the Barun Khola and the Topke Khola. The photos shown were taken by Toshio Yoshida. There is often only one flower per stem, but sometimes more than one. (The Bhutan form can have up to 5 flowers). The flowers are semi-nodding or laterally directed. The colour varies a lot with different shades of blue or mauvy-blue or wine-purple, but pure blue is rare in Nepal. It is open to interpretation whether these are considered species in their own right or subspecies – Chris has not yet made up his mind. One picture was of a very hairy plant with 6 petals – Chris is not sure what the status of this plant is at present.

In west Nepal there is a small colony of *M. grandis*, separated by hundreds of a miles from those further east. This strange distribution applies to a number of other plants, e.g. *Incarvillea himalayensis*, *Meconopsis paniculata* and others. *M. grandis* from this west Nepal area is small (about 30-40 cm tall at flowering). It is a very perennial plant. The pollen has been shown to differ in the western and eastern populations: in east Nepal the pollen is in tetrads (fours) while in west Nepal it is in monads. He is not sure of the significance of this either evolutionarily or taxonomically. Chris showed a picture taken by Polunin and another more recently of the western population, attributable to Mani Shrestha..

The interesting discussion that followed is only reported partially and briefly as I could not be at the meeting and I could not hear well enough what was said, on the tape-recording. There was a long contribution from James Cobb on taxonomic methods that unfortunately I could not decipher. There was a question on *M. cambrica* – Chris explained that this is so distinct from anything else that in all probability it will have to be separated out from the rest of the genus. It does not fit into the Asiatic *Meconopsis* and neither does it fit in with existing genera such as *Cathcartia* or *Papaver*. It would be silly to retain *Meconopsis* for *M. cambrica* and to create a new generic name for all the Asiatic *Meconopsis* species, which strictly speaking, to follow the rules of botanical plant nomenclature, should occur as the generic name, *Meconopsis*, was created for *cambrica*.

Chris was grateful to the following for letting him have their pictures: Joe Atkin, Bill Baker, Anne Chambers, Eico Chiba, Harry Jans, Tim Lever, Evelyn Stevens, John Mitchell, Martin Walsh and Toshio Yoshida. He also used some of his own pictures.