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Some examples of those birch forests can be seen on the way down towards Truchillas. The descending sequence of the vegetation series is: 1-the humid-hyperhumid vegetation series of the melojares (*Holco mollis-Querceto pyrenaicae* sigmetum), 2-the subhumid-humid vegetation series of the melojares (*Genisto falcatae-Querceto pyrenaicae* sigmetum) and 3-the vegetation series of the encinares (*Genisto hystricis-Querceto rotundifoliae* sigmetum). The riparian geoseries riparia is again formed by the series of the elm (*Aro maculati-Ulmeto minoris* sigmetum), poplar-arboreal willow (*Populo nigrae-Saliceto neotrichae* sigmetum), shrubby willows (*Saliceto lambertiano-salvifoliae* sigmetum) and alder (*Galio broteriani-Alneto glutinosae* sigmetum). This pattern is repeated in the landscape till Villafranca del Bierzo.

(The vegetation of stretch Villafranca del Bierzo-Pedrafita do Cebreiro-Liñares)

JESÚS IZCO SEVILLANO & JAVIER AMIGO VÁZQUEZ

GEOMORPHOLOGY AND GEOLOGY

In Villafranca del Bierzo, we leave the open landsapes of the Bierzo Depression, and begin the climb to the pass at Pedrafita do Cebreiro. Immediately after Villafranca the road crosses the River Burbia, then goes through a short tunnel, then crosses the River Valcarce. The watershed up to the pass drains into this river, which drains into the Burbia; the Burbia then drains into the Sil, which in turn drains into the Miño, which flows into the Atlantic at the border between Spain and Portugal. Between Villafranca (at 504 m) and the top of the pass (1099 m), the road climbs 595 m, with a mean gradient of 5.3% from Vega de Valcarce up.

Our route from Villafranca - following the Way of Saint James, the traditional pilgrim's route to Santiago - is representative of the topography of this region: the landscape is rugged, cut by deep lateral valleys, with steep slopes but peaks rounded as a result of their great age. In similar areas nearby, more than 60% of map area has class-6 slope (> 55%) (Izco, 1997).

The Pedrafita Pass marks the division between two watersheds. The River Navia has its source nearby: it runs initially towards the northwest, and eventually reaches the Cantabrian Sea close to the village of Navia (Asturias).

The town of Pedrafita do Cebreiro, just past the pass, still retains some traditional dwellings with roofs thatched with rye straw or broom (*Cytisus scoparius*). Here, our route leaves the main road (the N-VI) and continues via a local road (the C-535), westwards to the village of Liñares. A bit further is the San Roque pass (1,275 m), the highest point of this stretch of the excursion, at the boundary between the watersheds of the Navia and the Lor (a tributary of the Sil). Looking north and west from this pass, we can see a high plateau at ca. 1,350 m, which is result of old erosion levels.

GEOLOGY

The Bierzo Depression is covered by very deep tertiary sediments, readily identifiable in view of their red colour; in the lower and less abrupt part of this depression, Tertiary sediments are covered by Quaternary materials. Apart from these sediments, the northwestern part of the Iberian Peninsula (including the westernmost extreme of the Cantabrian Mountains, the *Cordillera Cantábrica*) is composed of Palaeozoic materials (Cambrian, Ordovician, in some cases Precambrian) that underwent violent folding during the Hercynian orogeny. All these materials are ordered in bands oriented SSE-NNW, forming part of the great Narcea Antiform (*Anticlinorio del Narcea*) which in turn forms part of the Asturian Arch (*Arco Asturiano*) (Anon., 1971).

The dominant materials are Cambrian and Ordovician slates, which break up easily. Intercalated with these slates are thin bands of calcareous materials (limestones and Vegadeo dolomites). Also present, though less frequent, are dykes of quartzite, which form prominent outcrops in valleys in which erosion has removed the softer materials (Anon., 1980). The limestones and dolomites are quarried for construction material, at some locations on an industrial scale. The traditional houses of the village of Liñares have limestone walls and slate roofs.

BIOCLIMATOLOGY

Between Villafranca and Liñares the climate changes drastically. The higher precipitation and lower temperatures, due to the higher altitude, are clearly apparent. Villafranca (504 m a.s.l.) has an annual mean temperature of 12.3°C and mean annual precipitation of 901 mm, while Pedrafita (1099 m a.s.l.) has an annual mean temperature of 8.0°C and mean annual precipitation of 1897 mm. The differences are even more marked if we consider the bioclimatic regimes prevailing in the two locations: Villafranca is Mediterranean, while Pedrafita is Temperate. This can be considered one of the most marked bioclimatic transition in a short space of Europe, in that Mediterranean and Temperate are the only two macrobioclimates (*sensu* Rivas-Martínez) present in the continent. The vegetation changes associated with this transition are evident during the ascent to Pedrafita.

The Bierzo Depression has a Mediterranean bioclimate with seasonal rainfall regime, and Villafranca is situated in the Upper Subhumid rainfall belt (*ombropiso*) of the Upper Mesomediterranean temperature belt (*termopiso*). Potential vegetation is evergreen *Quercus rotundifolia* woodland (*Genisto hystricis-Quercetum rotundifoliae*). At higher altitudes, the increasing rainfall leads to replacement of the evergreen *Q. rotundifolia* with the deciduous *Q. pyrenaica*, in accordance with the pattern observed throughout the northwest Iberian Peninsula (Izco et al., 1991). Note that this switch from evergreen to deciduous occurs at a lower altitude than the Mediterranean-Temperate transition. Furthermore, the severe deforestation and replacement of mature woodland with species-poor successional scrubland communities means that physiognomic interpretation of the landscape is difficult.

There are no intermediate weather stations in the Mediterranean section of the territory. However, indirect models allow us to trace the gradual transition from Mesomediterranean to Supramediterranean, and from Upper Subhumid to Hyperhumid. The lower part of the zone in which the potential vegetation is *Quercus pyrenaica* woodland (*Genisto falcate-Quercetum pyrenaicae*) is characterized by the presence of small villages, associated with intensive cultivation of chestnut and with highly productive small river terraces and gently sloping hillsides. At altitudes above 750 m, the villages are very different: river terraces are not present at these altitudes, and the villages are located on flat areas on hillsides suitable for vegetable cultivation. Their inhabitants have traditionally dedicated most of their labour to extensive livestock farming, which is currently in clear decline. From this altitude upwards, the potential vegetation is another *Quercus pyrenaica* woodland (*Holco mollis-Quercetum pyrenaica*).

As is normal, the Mediterranean-Temperate transition does not take place at the watershed transition, but in fact somewhat earlier, on the Mediterranean side of the pass, influenced by topographic factors, at about 900 m. From this level to the Pedrafita Pass, and from here to Liñares and the San Roque Pass, our route passes through the Upper Supratemperate belt, with Upper Hyperhumid to Ultrahyperhumid rainfall regime. This territory, though it forms part of one of the best-conserved natural areas in Galicia, is severely deforested and shows marked human influence. The gently sloping mountains of the Montes do Rañadoiro are without woodland on their peaks and on their southern slopes, though relict stands remain on the northern slopes, interspersed with patches of meadow and scrub that reflect the characteristic land-use patterns in this area. There are also small areas of *Pinus sylvestris* plantation, comprising rather small individuals, the product of attempts at reforestation in the 1960s.

The potential vegetation of these Supratemperate territories of O Cebreiro comprises both *Quercus pyrenaica* woodlands (*melojares*) of the association *Linario triornithophorae-Quercetum pyrenaicae* and *Quercus petraea* woodlands of the association *Linario triornithophorae-Quercetum petraeae*. In the altitudinal range between 900-1400 m beech forests (*Omphalodo nitidae-Fagetum sylvaticae)* occur as discontinuous patches in topographically favourable conditions, such as North-facing slopes.

CHOROLOGY AND MIGRATION ROUTES

The Bierzo Depression forms part of the Orensano-Sanabriense Sector of the Carpetano-Ibérico-Leonesa Subprovince of the Mediterráneo-Ibero-Atlántica Province. The temperate territories form part of the Laciano-Ancariense Sector of the Orocantábrica Subprovince of the Atlántica Province.

The district (*municipio*) of Cebreiro, the only Galician district visited during this excursion, covers the area comprising the lower-altitude peaks of the Sierras Orientales (Eastern Mountains) of Lugo Province. These mountains, which constitute the boundary between Galicia and León, constitute a prolongation of the Cantabrian Mountains at their

southwest extreme, and thus biogeographically form part of the Orocantábrica Subprovince. From north to south, the Sierras Orientales comprise the Sierra de Ancares (highest peak Pico Cuiña, 1998 m), the Montes do Rañadoiro (Carballal, 1474 m) and the Sierra do Courel (Formigueiros, 1654 m).

The beechwoods of the Sierras Orientales have been considered the westernmost populations of this species. These woodlands are located in the Supratemperate belt at altitudes between 900 and 1400 m (optimum 1100 - 1250 m). By contrast with the extensive areas of beechwood located in eastern Spain, the end-of-range beechwoods of northwest Spain currently occur as small patches with a highly fragmented distribution, clearly reflecting environmental conditions and human activity; the recent history of the latter has been clearly illustrated by a study based on the analysis of various legal documents (wills, litigations, land transactions, etc.) (Guitián, 1996). In recent years, beeches have been found within Mesotemperate woodlands of the association *Blechno spicantis-Quercetum roboris*, at altitudes of 400 - 500 m upwards (Rodríguez-Guitián et al., 1996a).

It has traditionally been speculated that beech reached the westernmost extreme of the Iberian Peninsula from Pyrenean nuclei, leaving the Pyrenees about 4000 years ago and travelling along the Pyrenean-Cantabrian chain to reach Galicia about 1000 - 1500 years ago, the period of maximum expansion of this species. This latter date is accepted by Janssen (1996). However, previously published pollen datings of beech in the Cantabrian Mountains imply a migration rate of 190 - 320 m/year (Rodríguez-Guitián et al., 1996b), which is too slow to explain departure from the Pyrenees 4000 years BP and arrival in Galicia 1000 - 1500 years BP. On the basis of new analyses of pollen from 19 sites in the Cantabrian Range, these authors argue that beech was present in the northwest Iberian Peninsula at much earlier dates than those reported previously, and indeed earlier than the theoretical date for arrival in the western French Pyrenees. Specifically, they report data indicating the presence of beech in the northwest about 4000 years BP in Prado (Maldonado, 1994) and about 7500 years BP in Lagoa do Marinho (Ramil-Rego, 1993). All this leads the authors to suggest that "almost certainly, at least part of the Iberian populations of this species are autochthonous in origin, regardless of whether it is confirmed that Central European stocks arrived during the Holocene by way of the Pyrenees. Likewise, it seems likely that areas of refuge existed in various parts of the Iberian Peninsula, (...) providing bases for the recolonization of large parts of the territory previously occupied".

VEGETATION

1- From Villafranca to Pedrafita

During this ascent, we cross territories corresponding to four vegetation series, which in order of appearance are:

Genisto hystricis-Querco rotundifoliae Sigmetum: a Mesomediterranean Orensano-Sanabriense holm oak woodland series whose disturbed stages include the *Arbutus*

unedo scrub (*madroñales* of *Erico scopariae-Arbutetum unedonis*, the *Genista* spine cushion scrub (*Genisto hystricis-Cytisetum multiflori)*, and even the *Cistus* scrub (*jarales* of *Cisto ladaniferi-Genistetum hystricis)*. In practice, these communities are present in a highly degraded state near the Villafranca, the most visible characteristic of the vegetation being *Cytisus multiflorus* formations interspersed with patches of *Cistus ladanifer* scrub, which prefers drier locations, since its optimum is in the Dry and Subhumid rainfall belts. Individuals of *Quercus rotundifolia* or *Erica scoparia* survive on spurs.

At about 600 m and in north-facing valley bottoms, we find the serial complexes *Genisto falcatae-Querco pyrenaicae Sigmetum* and *Holco mollis-Querco pyrenaicae* sigmetum. As we pass into the Supramediterranean, *Erica scoparia* and *Quercus rotundifolia* are generally no longer seen, though isolated individuals are occasionally present at lower levels on south-facing slopes or spurs. Instead of these species, we see small stands of *Quercus pyrenaica*, and chestnut stands (*soutos*, small monospecific stands of *Castanea sativa* managed for chestnuts as food and fodder); however, most of the landscape bears substitution scrubs dominated by *Cytisus multiflorus* or *C. striatus* (*piornos* in spanish and *xestas* in galician). The potential vegetation over the entire altitudinal range of the Supramediterranean belt is *Quercus pyrenaica* woodland, but only a small part of this belt, at about 600 - 700 m, bears vegetation of the *Genisto falcatae-Querco pyrenaicae Sigmetum* (possible indicators of this series being *Genista hystrix* and *Cistus ladanifer*), and even then the distribution is discontinuous. The rest of this belt is territory of Carpetano-Occidental and Orensano-Sanabriense woodland belonging to the association *Holco mollis-Quercetum pyrenaicae*, of which little remains, most having been felled or burnt and replaced by *Cytisus multiflorus* scrubs (*Lavandulo sampaioanae-Cytisetum multiflori*), *Cytisus striatus* scrubs (*Cytiso striati-Genistetum polygaliphyllae*) or heathlands (*Genistello tridentatae-Ericetum aragonensis)*.

At altitudes of 900 m upwards, coinciding with the change in macrobioclimate, we enter the territory of the *Linario triornithophorae-Querco pyrenaicae Sigmetum*, a serial complex that is clearly different from the others in view of its markedly Orocantabrian (Eurosiberian) character. As in the previous cases, little remains of the mature woodland type as we ascend to Pedrafita, though the series is apparent from the presence of *Cytiso scopariae-Genistetum polygalyphyllae* scrubs (of which a particular subassociation, *cytisetosum multiflori*, is present in this region) interspersed with heathlands with *Daboecia cantabrica* (*Daboecio-Ericetum aragionensis)*; presence of *Ulex galli* into this last association shows the oceanic character of local weather. In addition, on banks and steep slopes colonized by trees, birches (*Betula pubescens* subsp. *celtiberica*) and sycamores (*Acer pseudoplatanus*) are frequent, and indicative of new pre-forest communities that can be seen in the Supratemperate but not the Supramediterranean belt.

2- Montes do Rañadoiro

This group of mountains is located between the Sierra de Ancares and the Sierra de O Courel, both of which contain higher peaks.

The *Quercus pyrenaica* woodlands occur preferentially on south-facing slopes, though even with this orientation they rarely occur at altitudes of more than 1250 m. Their potential area is largely covered by broom scrubs of the *Cytiso scoparii-Genistetum polygaliphyllae cytisetosum multiflori*, a subassociation that reflects a degree of summer drought within the Hyperhumid rainfall regime generalized in this territory. Oak woodlands dominated by *Quercus* x *rosacea* and with *Q. pyrenaica* occasionally present (*Linario-Quercetum petreae*) are predominant on sites not facing south, and even on south-facing sites at altitudes in excess of (1250) 1300 m. Mature woodlands of *Linario-Quercetum petreae* are likewise replaced by broom scrubs similar to those already mentioned, but rather more moisture-loving, and probably assignable to *Cytiso scoparii-Genistetum polygaliphyllae ulicetosum gallii*. Occasionally, we find a distinct version of these oakwoods, artificially maintained in a pre-mature state dominated by *Betula celtiberica*. These formations are known locally as *biduedos* (from *bíduo*, birch in Galician), although syntaxonomically they can be interpreted as a variant of the typical climax community (*Linario-Quercetum petraeae* var. of *Betula celtiberica*).

The third vegetation series detectable in these mountains is clearly at an extreme of its distribution, representing the westernmost spontaneous formations of *Fagus sylvatica* in Europe. It is found only in patches on north-facing steep slopes, often in areas of hard limestone outcrops. The relict nature of this forest is apparent from the fact that felling of the mature woodland gives rise to non-beech woodland (oakwood or birchwood) subsequently develops. The head of the series, *Omphalodo nitidae-Fagetum sylvaticae*, has a recovery (pre-forest) stage dominated by *Corylus avellana*, which in numerous parts of the Sierras Orientales (Ancares, Rañadoiro, Courel) constitutes the only surviving evidence of the presence of beechwoods in the recent past.

In the Sierra de Ancares and the Sierra de O Courel, both beechwoods and *Quercus petraea* oakwoods may come into contact with mixed sycamore woodlands of the association *Luzulo henriquesii-Aceretum pseudoplatani* in moister soils, and with birchwoods of the association *Luzulo henriquesii-Betuletum celtibericae* at higher altitudes (from about 1400 m). In the Montes do Rañadoiro, however, the altitude reached is insufficient, and the areas of forest are too small, for such communities to be present.

The landscape of the Pedrafita do Cebreiro district is dominated by scrub communities. Apart from the broom scrubs already mentioned, at least two types of heath can be recognized: a taller community, dominated by *Erica australis* subsp. *aragonensis*, belonging to the association *Daboecio cantabricae-Ericetum aragonensis*, and a shorter gorse heath belonging to the association *Halimio alyssoidis-Ulicetum gallii*. The former association may form part of the *Quercus pyrenaica* series (*Linario-Querco pyrenaicae Sigmetum)*, or equally of the montane *Quercus petraea* series (*Linario-Querco petraeae Sigmetum)*. By contrast, the *Halimio-Ulicetum gallii* always occurs in the Ultrahyperhumid rainfall belt, where it replaces montane oakwoods or beechwoods.

Riparian vegetation is scarcely present along our route, since only very young and fast-flowing streams are present, and often any arboreal vegetation has been removed to make way for *Cynosurion cristati* meadows along the banks. On north-facing slopes, and especially close to beechwoods, fragments of the Supratemperate Laciano-Ancarense community *Festuco giganteae-Fraxinetum excelsioris* can be recognized. At altitudes below 800 m, when slopes become less steep in valley bottoms, alder communities of the association *Valeriano pyrenaicae-Alnetum glutinosae* begin to occur; these are particularly evident in the Mesotemperate belt, and even penetrate several kilometres into the Mediterranean Orensano-Sanabriense territory.

3- Liñares

The most interesting feature of this stop is the contrast between the acidophilous vegetation (characteristic of the region in general) and the vegetation associated with the outcropping of a band of limestone, which includes a patch of *Omphalodo nitidae-Fagetum sylvaticae* and calciphilous communities of the *Rhamno-Prunetea spinosae*, *Asplenietea trichomanis* and *Festuco-Brometea*.

Along the short track leading to the beechwood from the village of Liñares, on the banks beside the track itself, we can see more or less representative fragments of the calciphilous perennial pasture communities of the *Helianthemo cantabrici-Brometum erecti* (class *Festuco-Brometea erecti*). Various species of this association can be seen, forming small fragmented patches, notably *Anthyllis vulneraria* subsp. *alpestris*, *Acinos alpinus* subsp. *pyrinaeus*, *Brachypodium pinnatum* subsp. *rupestre*, *Briza media*, *Dianthus hyssopifolius* and *Helianthemum croceum* subsp. *cantabricum*, in addition to various orchids. In the Sierras Orientales, this communities is at an extreme of its distribution, like the beechwoods, since it represents the extinction of the communities of the alliance *Bromion erecti* (and thus of the whole class) towards the south-west of the Atlantic Province.

The structure of the outcropping limestone band and local topography gives rise to small ledges with lithosoils that favour the presence of psychroxerophilous calciphilous communities assignable to the alliance *Festucion burnatii* (class *Festuco-Ononidetea striatae*). The association *Koelerio vallesianae-Erodietum glandulosi* was described from this territory, though only a few members of this community reach Liñares, and the association cannot be considered well-formed here. On the banks alongside the track we can see *Koeleria vallesiana*, *Arenaria grandiflora* subsp. *incrassata* and *Hippocrepis conmutata*.

Where the track-side banks are steeper and stonier, we find calciphilous rupicolous communities of the association *Saxifragetum trifurcatae* (*Saxifragion trifurcato-canaliculatae*, class *Asplenietea trichomanis*), rich in endemics and well-represented in the nearby Sierra de O Courel; in Liñares, however, suitable fissured walls are lacking, and only a few of these species are present, namely *Hutchinsia alpina* subsp. *auerswaldii*, *Crepis albida* subsp. *asturica* and *Leontodon farinosus*.

The Liñares beechwood is a reasonably representative example of *Omphalodo nitidae-Fagetum sylvaticae* in the territory: it contains an acceptable number of the humus-loving geophytes characteristic of the Orocantabrian beechwoods, such as *Galium odoratum*, *Mercurialis perennis*, *Lilium martagon*, *Milium effusum*, *Paris quadrifolia* and *Sanicula europaea*, though other acidophilous species are also frequently present, particularly species whose optimum is in northwest Iberia, such as *Omphalodes nitida*, *Saxifraga spathularis* and *Luzula henriquesi*.

Along the fringes of the beechwood, we see some woody and herbaceous communities that are typical of such locations. One such community, characteristic of clay soils developed from limestone, is a mesotrophic thorny woody community. The most conspicuous phanerophytes of this formation are *Rosa villosa*, *Rosa canina*, *Crataegus monogyna* and *Ilex aquifolium*, and it is probably best considered an extreme form of *Berberidion vulgaris* (class *Rhamno-Prunetea*).

On calcareous banks at the upper limit of the beechwood, we find a characteristic herbaceous community that contains species of the woodland-fringe community *Trifolio-Geranietea* alongside others characteristic of *Festuco-Brometea* or even *Querco-Fagetea*. This community is typically dominated by the conspicuous species *Iris latifolia*, accompanied by *Lilium martagon*, *Fragaria vesca*, *Vicia sepium*, *Ranunculus tuberosus* and *Mercurialis perennis*. These species develop on soils of some depth and with marked depletion of carbonates in the surface layers, as indicated by the extensive areas often occupied by *Pteridium aquilinum*, which gives the community a rather misleading appearance. We have given this association the provisional name of *Galio rivularis-Iridetum latifoliae*.

Finally, when the beechwood occurs on an acid substrate (schists, phyllites), different substitution communities occur. The shrub fringe is replaced by a community of *Cytisus scoparius* and *Erica arborea*, while the herbaceous fringe loses its eutrophic species (for example, *Fragaria vesca*), and gains species such as *Saxifraga spathularis*, *Melampyrum pratense* and *Digitalis purpurea*, forming a community assignable to *Linarion triornithophorae* (class *Trifolio-Geranietea sanguinei*).

Above the beechwood, we climb gradually to the coll at San Roque, the boundary between the two watersheds. Here the substrate is siliceous, and the scrub that covers these peaks is patently acidophilous: we see patches of the broom scrub *Cytiso scoparii-Genistetum polygaliphyllae*, but the predominant scrub community is a dense gorse heath, dominated by *Ulex galli* and various low Ericaceae; this community can be assigned to the Supratemperate Ultrahyperhumid association *Halymio alyssoidis-Ulicetum gallii* (*Daboecion cantabricae*, class *Calluno-Ulicetea*). Also present in these mountains, in drier locations (i.e. at lower altitudes or on south-facing slopes), are heaths of the association *Daboecio-Ericetum aragonensis* (likewise a member of *Daboecion cantabricae*), which includes *Erica australis* subsp. *aragonensis* and *Genistella tridentata* and lacks *Ulex galli*.

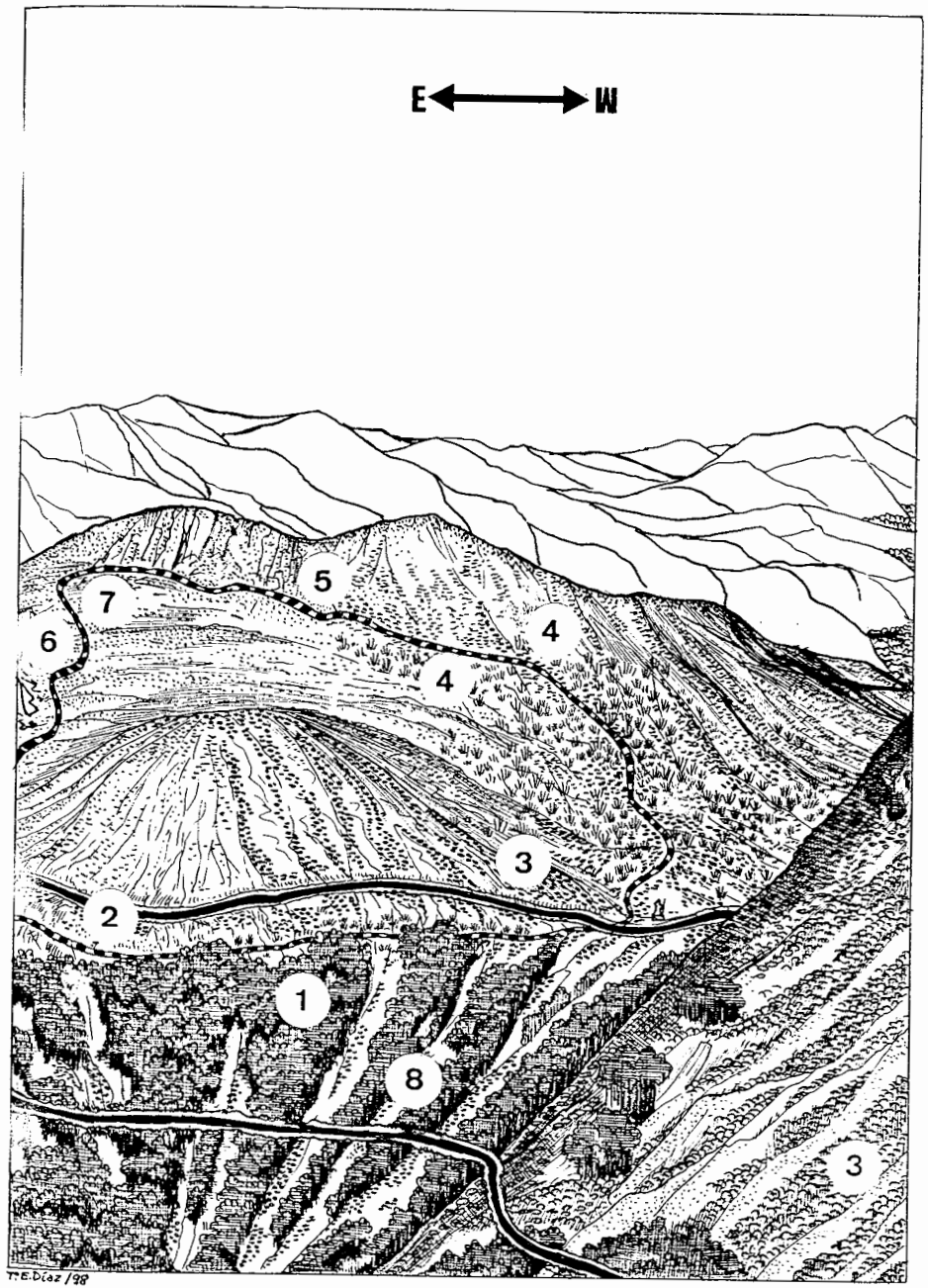
At the end of our walk we cross a calcareous dyke, quarried for stone, in which we again see the basophilous substitution and permanent communities observed by the beech-wood.

Of the remaining vegetation types present around Liñares, only meadows make an important contribution to the landscape. The most frequent such communities are meadows subjected to a mixed mowing and grazing regime. Soil nutrient levels and pH are both rather low, except where the meadow is located below a limestone hillside. In valley bottoms in the Sierra do Courel, meadows assignable to *Arrhenatherion elatioris* have been described; however, the more usual meadow communities in these mountains are of the alliance *Cynosurion cristati*, within which the association that best defines floristic composition is *Merendero pyrenaicae-Cynosuretum cristatae*. Also sometimes present in this territory are Supratemperate grazed mat-grass (*Nardus stricta*) pastures of the alliance *Violion caninae*, falling within the association *Serratulo seoanei-Nardetum strictae*; according to the degree of variability in grazing regime, transitions between this association and *Merendero-Cynosuretum cristati* may be observed.

PICTURE 29

Locality: Linares (Cebreiro). Lugo, Galicia.
Altitude: 1,300 m
Date: 20-VII-1999
Biogeography: Subsector Ancarense subsector (Laciano-Ancarense sector, Orocantabrian subprovince)
Bioclimatic belt: Supratemperate (montane), hyperhumid.
Lithology: Mixtured, calcareous and siliceous.

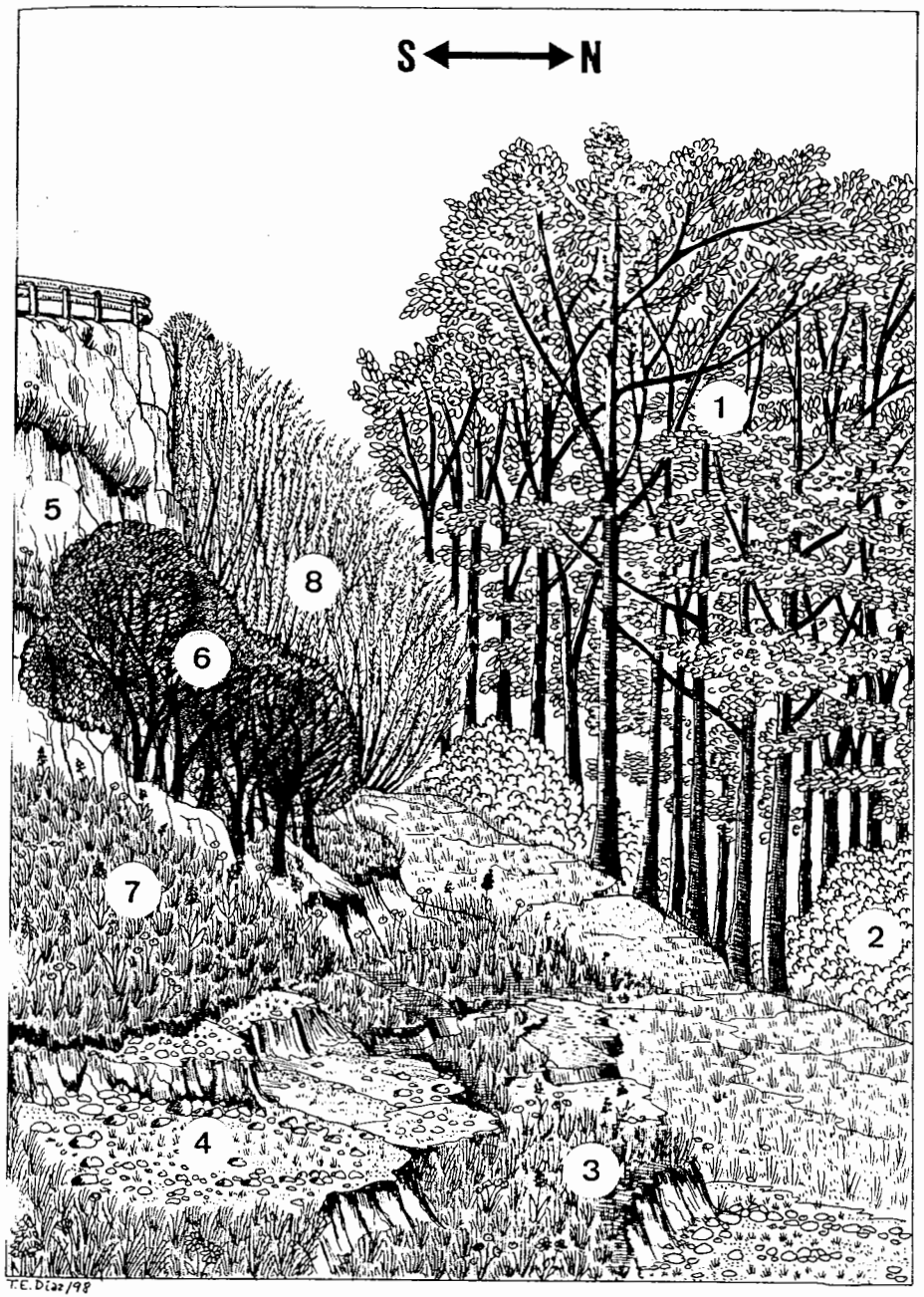
1. Ancarense beech forests (*Omphalodo nitidae-Fagetum sylvaticae*).
2. Spiny mantle of beech forest alternating with grasslands (*Bromion*) and rupicolous communities.
3. Heathlands with gorses (brezal-tojal) (*Halimio-Ulicetum gallii*)
4. Piornal (*Cytiso scoparii-Genistetum polygaliphyllae*)
5. Abandoned crop-fields.
6. Limestone quarry.
7. Basophilous grasslands of *Helianthemo cantabrici-Brometum erecti* (*Bromion*) and megaphorbic community of *Iris latifolia*.
8. Megaphorbic higrophilous community of *Chaerophyllo hirsuti-Valerianetum pyrenaicae*.



PICTURE 30

Locality: Linares (Cebreiro). Lugo, Galicia.
Altitude: 1,250 m
Date: 20-VII-1999
Biogeography: Subsector Ancarense subsector (Laciano-Ancarense sector, Orocantabrian subprovince)
Bioclimatic belt: Supratemperate (montane), hyperhumid.
Lithology: Mixtured, calcareous and siliceous.

1. Beech forest (*Omphalodo nitidae-Fagetum sylvaticae*).
2. Spiny mantle of the beech forest.
3. Basophilous grasslands of the *Helianthemo cantabrici-Brometum erecti* (*Bromion*).
4. Grasslands of *Festuco-Poetalia*
5. Rupicolous communities of limestone rocks with *Crepis asturica*.
6. *Corylus avellana* community.
7. Megaphorbic community of *Iris latifolia*.
8. Piornales on suliceous substrata (*Cytiso scoparii-Genistetum polygaliphyllae*).



LAND USE

The entire Sierras Orientales area is classified as a "high-mountain agriculture" zone. One of the most notable features of such areas has been the marked population decline over the last half-century, which has of course had profound effects on land use and consequently on landscape.

The traditional rural settlement pattern in this region is based on small groups of houses, with labour mostly devoted to livestock rearing and relatively little cultivation of crops, these being destined mainly for own consumption. The land-use activities can be viewed as forming a series of concentric bands, at increasing distances from the nucleus constituted by the village itself:

1) The first band, adjacent to the houses themselves, contains small (often very small), vegetable plots, or *leiras*, for cultivation of cabbages and potatoes, and broad beans and onions if the climate permits (i.e. at lower altitudes in the Lower Supratemperate belt).

2) The second band, still very close to the village, contains the chestnut grove (*souto*), with a highly degraded understorey as a result of frequent transit. The chestnut has traditionally constituted a important part of the diet, but nowadays *soutos* are often abandoned as a result of both changing dietary habits and the ageing of the population.

3) The third band, which may extend a considerable distance from the village, contains the meadows and pastures. These typically extend in ribbon-like fashion along the banks of rivers and streams, facilitating irrigation with the water that feeds into the watercourse. This band can also be considered as that containing the *searas*, plots for the cultivation of cereal (generally rye); unlike the meadows, these are generally located on dry and preferably sunny slopes.

4) The fourth band contains the *devesa*, the area of woodland used as a source of timber and firewood, and to some extent for hunting. Depending on its size, rights to the *devesa* might be shared by several villages in a parish (i.e. the administrative unit between village and *municipio*). Within this fourth band we should also include treeless moor, mostly gorse heath, generally held communally and periodically burnt to improve grazing for sheep or goats.

Around settlements in the Upper Supratemperate belt, this pattern is somewhat modified: there is no *souto*, and the village is typically closer to its *devesa* (as in the case of Liñares).

Historically and currently, there has been little industrial activity in this area. However, iron smelting (*ferrerías*, in galician) was an important activity in the whole region between the 17th and 19th centuries, and the consequent demand for wood as fuel led to very considerable deafforestation; indeed, over-exploitation of forest for fuel was perhaps the chief reason for the decline of this industry.

Mining has also been historically important in this region, dating back to the gold-mining activity of the Romans. Quarrying for marble and limestone has left its mark on a number of outcrops, but in recent decades slate quarries, including several large operations, have had much more devastating effects on landscape.

VILLAFRANCA DEL BIERZO-LEÓN (21 July)

(Geobotanical excursion between Villfranca del Bierzo and León)

ÁNGEL PEÑAS MERINO & EMILIO PUENTE GARCÍA

INTRODUCTION

This journey goes through territories belonging to the phytogeographic Laciano-Narceense subsector (Laciano-Ancarense sector, Orocantabrian subprovince, Atlantic European province, Eurosiberian region); in the Ubiñense subsector (Ubiñense-Picoeuropean sector, Orocantabrian subprovince, Atlantic European province, Eurosiberian region); the Orensano-Sanabriense sector and the Leonés sector (Carpetan-Leonesian subprovince, Iberoatlantic province, Mediterranean region).

The Ubiñense subsector, located in the central zone of the Cantabrian Range, is geologicaly characterized by a prevalence of Devonic and Carboniferous limestones with clear alternances of slates, sandstones, and siliceous conglomerates.

From the bioclimatic point of view it includes, in the province of León, territories of temperate oceanic and temperate oceanic, submediterranean bioclimate with supratemperate (montane), suprasubmediterranean, orotemperate (subalpine) and orosubmediterranean thermotypes, and humid and hyperhumid ombrotypes. It is worth noting the submediterranean climatic character which is present in many territories of this subsector mainly in those near the Mediterranean area, or in places strongly influenced by it (there is a somewhat summer aridity, although never reaching two months).

Floristically, *Armeria bigerrensis* subsp. *legionensis, Centaurea janeri* subsp *babiana, Centaurium somedanum, Fritillaria legionensis* and *Saxifraga babiana* can be considered endemic taxa of the Ubiñense subsector.

Vegetation during the journey

In Ponferrada we take the road towards Villablino. The road goes along the course of the Sil river and thus along this stretch the various communities associated to the riverine vegetation series, above commented, can be appreciated. Outside the riparian environment only some seral stages of the "carrascales" (*Genisto hystricis-Querco rotundifoliae* sigmetum) and "melojares" (*Genisto falcatae-Querco pyrenaicae* sigmetum) vegetation series can be observed. At Susañe del Sil the last example of *Genisto histricis-Querco rotundifoliae* sigmetum can be seen on a south-facing slope on lithsols, completely surrounded by communities of the *Holco mollis-Querco pyrenaicae* sigmetum.

After passing the Ondinas dam, the valley narrows markedly and heathlands of the associations Daboecio cantabricae-Ericetum aragonensis and *Genistello tridentatae-Ericetum aragonensis* appear. This indicates that we are entering the Orocantabrian vegetation series of the "melojares" (*Linario triornithophorae-Querco pyrenaicae* sigmetum) and crossing again the Mediterranean-Eurosiberian border.