

cones, until the planting season, and that they should be kept dry. I had a quantity spoiled by some wet moss, with other plants being imprudently packed with them, in my absence. The port and bearing as well as colour, are quite different from that of any other species. The form, where the tree is fairly developed, is round and massy, frequently resembling that of some of the deciduous trees, the long arms sweeping the ground. The foliage is longer, and much more tangled than that of the Scotch fir, and the green much more intense. It is so dark, that the Spanish woodmen distinguish it by the name of *pino negro*, the two varieties of the *sylvestris* being called *blanco* and *roxo*. The growth, as far as I could judge, appeared to be about the same or of rather greater rapidity than that of the Scotch fir. The wood is highly resinous, so much so that it serves for torches, and it is reputed in the Pyrennees to be of very great duration. A peculiar quality, which, if it succeed in other respects, will make it invaluable in some parts of England, is that of resisting the wind. From some cause not explained, but which proceeds, in all probability, from the operations of nature in restoring the equilibrium of temperature between the Siberian regions of the high Pyrennees with that of the comparatively burning plains below; it may be connected probably also, with the arrangement which has made the *puertos* or passes of this chain the highest in Europe; they reach nine and even ten thousand feet, the highest peaks being a very little more elevated than the ridges which unite them. Whatever be the cause, the wind in those upper regions rages with a violence and constancy, unknown elsewhere, even in the Alps, where the same phenomena might be supposed to exist. There

are barrancos in the district of the Maledetta \*, where, according to the figurative expressions of the Spanish peasantry, it blows every day in the year. In these inclement regions, where I have observed the tree in every form and situation, I never saw an instance where the wind appeared to affect it, nor where it showed a weather side. At the upper limits of its habitat, where it is compelled to yield to the law of nature, and lower its "diminished head", the same rule is observed, and instead of the stunted and starveling appearance of the rest of the tribe in similar situations, it assumes the shape of a furze bush, presenting an impenetrable and bristling front of dark spiculæ on every side, the stem or branches being quite undiscoverable. This is the species to which the name of pyrenæica ought to have been given, it being, as far as observations have yet been made, peculiar to that chain. It may be expected to form a valuable addition to our forest trees, and it is singular that it should have hitherto been nearly unnoticed. It is mentioned in Sweet's catalogue as introduced in 1820, but in the botanical garden at Glass Nevin, near Dublin, is an individual of much longer standing. I have not seen that tree since I visited the Pyrennees, but I have little doubt, from the recollection of it, that it is the right sort. I could obtain no certain information of its history; most probably it came from Paris.

The principal remains of this pine on the French side of the Pyrennees, are at the lake of Gaube and at the Cirque de Gavarnie. A few remain at the Port de Benaasque, and at the Lac d'Oo, and there are some scraps

\* The highest peak of the Pyrennees, in Aragon.

on the Arriege. The noble forests which once clothed these mountains have disappeared by the ignorant barbarity of the peasantry, who have extirpated them, and the valuable iron mines of Vicdessos, on the Arriege, are dependent on the republicans of Andorre, who have been more provident, for the greater part of their fuel; which is transported across the range by roads scarcely practicable, over which I had great difficulty to lead a horse. The native forests of this noble species, must now be sought for on the southern side of the range. On the east of Benasque there is an extensive line covered with it, and nearer to Mont Perdu, another, which is nearly inaccessible, below the sources of the Cinca.

A contract was made some years since by a French company, who purchased it, and undertook to bring the timber down by the valley between Bigorre and Luchon, but after a considerable expence had been incurred in making roads, the Spanish government refused to ratify the bargain, and the forest is still standing.

These Spanish forests are likely to remain, as there are no roads for transport on that side, and no demand, excepting for a scanty supply of charcoal, which is made in a destructive and wasteful mode, but fortunately they are obliged, for their own convenience, to select the old trees, and the younger ones are left to supply their place.

The republic of Andorre occupies a wild and Alpine valley opposite to that of the Arriege, the waters falling to the side of Catalonia, and joining those of the Segre. The lofty ranges which bound this valley, are clothed with uncinata, and alone in the Pyrennees it resembles those of Switzerland, the lower part being covered with walnuts and other deciduous trees, and the upper

parts with continuous masses of dark pine of this species.

The *Rhododendron ferrugineum*, grows in the valley in prodigious quantities, attesting its elevated situation, and in the high pastures, above the trees, is the habitat of the beautiful *gentiana pyrenaica*, and other rare plants. These are the sites where this species is now found, and I conceive it has never been much extended beyond the Arriege to the east, and the Lac de Gaube and its district to the west, being replaced by the silver and Scotch fir as the chain respectively declines in height to its flanks. It is found both on the primary and secondary formations, and I am not aware of any difference in its growth, in these different soils.

We now proceed to the *p. pyrenaica* of Lapeyrouse, which grows at the foot of the chain, immediately opposite the highest range, and at an elevation probably from two to four thousand feet. Lapeyrouse had never seen these trees, but described them, as I have been informed, from the reports of others, who brought the cones and branches to him, consequently the original description in the work is quite erroneous. That in the supplement is however, extremely accurate\*. The foliage is of a light grass green, quite unlike any other European species. The spiculæ are very long, and of free growth. The tree is of elegant and noble form, and more resembles those of southern climates than most of the European sorts. The cones are of a light reddish green, and the seed is inclosed in a thin shell. The wood is not bad, but is of much inferior value to

\* I believe M. Lapeyrouse was indebted for his information, respecting this tree, and many plants of the southern side of the Pyrennees, to M. Paul Boileau, now maire of Bagneres de Luchon.

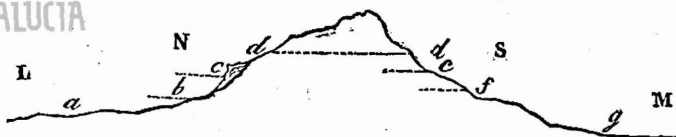


the other kinds which grow above it. I visited the place where these trees commence to appear, in the autumn of 1829, and procured some cones, as well as some from the trees in the garden of Mr. Lapeyrouse, near Toulouse, now in possession of his son, to whom I was indebted for them, where the trees planted about thirty years since are now of large size. On observing the real habitat of this tree, the impropriety of the name is evident, but subsequent observations will shew that it has a much wider range, and ought to have a different denomination. There are other species mentioned in the list of Lapeyrouse, but in the various tours I made in the Pyrennees, I never met with any other than the three species above mentioned. The *p. pumila*, I believe to be only the stunted *uncinata*, at a great elevation. Neither the spruce nor larch, *p. abies*, and *larix Europea*, exist in the Pyrennees, nor, I firmly believe, in any part of Spain. A contrary opinion is held in the country respecting the larch, but after much inquiry and observation, I am quite satisfied that the real larch neither exists, nor has existed in Spain. The word *alerce* certainly would appear to be connected with *larix*, but even if the Arab derivation, mentioned as traced by Mr. Drummond in the account of Cordova were incorrect, which there is no reason to suppose, words do not prove the existence or identity of species. The practice of Spain alone, where the same words are applied to different trees, in almost every province, would prove the fallacy of depending on etymology to solve questions of natural history.

The oaks on the north side of the Pyrennees are the *robur*, of both kinds; the *tosa*, or *tauzin* and its variety, the *pubescens*; the curious variety, the *fastigiata* or cypress

oak, which is found in the route to Gavarnie, and another variety of which I am ignorant of the name, the acorns having failed. It has peculiarly large buds and shoots, and an ill shapen leaf, and grows also in Asturias. Below towards Bayonne, and I believe on the opposite flank, in Languedoc and Roussillon, the *q. suber*, cork tree, abounds, but no evergreen oak is seen on the northern side of the high Pyrennees. On the Spanish side, high up, in the Peña de Ventimilla, and at the village of Andorre, are found the first evergreen oaks. In Aragon they are termed the Alcina, and are of the species which will be more particularly described hereafter as the Spanish oak. The elm described by Lapeyrouse as a variety of *montana*, under the name of *M. Pyrenaica*, is it be a variety, grows on the Malvern hills, where are two salices which are also common in the Pyrennees.

FOREST SECTION ACROSS THE HIGH PYRENNEES.



*N.* North side.

*L.* Plain of Languedoc.

*a* Lower region, oak chesnut, lime etc.

*b* Beech, and Yew, Holly, Elder, etc.

*c* Silver fir and Scotch Pine.

*d.* *Pinus Uncinata.*

*S.* South side.

*d.* *Pinus Uncinata.*

*e.* Scotch Pine.

*f.* *P. Pyrenaica* of Lapeyrouse, supposed to be identical with *P. Hispanica* of S. Segura.

*g.* *P. Halepensis.*

*M.* Mediterranean.

## SIERRA DE CUENCA.

The section is now carried across the Ebro, and the treeless plains of Aragon, to the Sierra de Cuenca. The lower zone of that range, on the south side, is the *p. halepensis*, above which, and mingled with it, but now nearly extinct, is found the *p. pinaster*, and above that, occupying the highest part of the range, I found the *sylvestris*. I have every reason to believe that there is no species at a higher level than this, which supplies Madrid with building timber, floated down by the Tagus to Aranjuez. This species is named by the woodmen *alvar*, and I saw it in the Val de Cabras, about three leagues from the city of Cuenca, the whole intervening pines, on the route from the city, being now exclusively the *halepensis*. Travelling to the west from this, we again cross the plains of La Mancha, and reach the Sierra de Segura, which is described in a visit to it. The upper zone of this vast district is covered by a tree, undescribed by any Spanish author or other to my knowledge, unless it be the same as that noticed by Roxas de San Clemente, as growing on the Sierra de Baza, which is a detached fragment of this range, at its southern end, and called by him *pinaster Hispanicus*.

The description of this tree is so exactly identical with that of Aragon, that I am quite convinced they are the same, and they grow at similar elevations. The cones of both these species are now in England, and as they have vegetated at the garden of the horticultural society, and in other places, it will be known certainly whether they be identical, of which I have not the smallest doubt, from ample examination and opportunity of judging.

The height of range of this species, in the localities mentioned, may be taken at from two to four thousand feet, and in the Sierra de Segura, somewhat more. One peculiarity is to be observed in the cones of this species. A quantity I brought from the spot were packed amongst geological specimens, and opened at Somerset house, during the heat of summer, when a delicious perfume, a perfect "Sabœan odour" exhaled from them, but was quickly lost in the gases of an atmosphere very unlike that of its native Sierra.

From a variety of concurrent and cross testimony, I have no doubt whatever that this same species exists in the Sierra de Cuenca, in that part of it to the south, where are the sources of the Gabriel, the chief subsidiary of the Xucar. This district is called the Marquesado de Moya, and the timber of it is floated down to Valencia, where it is known in the timber yards, by the name of pino blanco. As the species is peculiar to the country, and is thus widely spread, it ought to be denominated *p. Hispanica*. The tree would be a noble addition to our park or ornamental kinds, from the differences of its foliage from the common kinds, and the beauty of the form. It is essential to observe that its native habitats are entirely on limestone. The timber cannot be called good, but is of middling quality, probably a little better than that of the silver fir. It is white and dry, without much turpentine, and by the navy was used for decks, and similar purposes. The lower zone of the Sierra de Segura is of *halepensis*. There is said to be *p. pinea*, but it never occurred in the wide range I took through those forests. This forest supplies the building timber of Granada, at least the best quality, the forests of *pinea* which probably supplied the Moors being now extinct.

South of the Sierra de Segura is the Sierra Nevada, on the north side of which are now no pine forests or even remains of them. In the neighbourhood of Loxa are remnants of *halepensis*, which supply their scanty stock of fuel. On the southern side, the forest of Macael, which is in an elevated situation of the Sierra de Filabres, is of *halepensis*. The woodwork of the Alhambra appeared to me to be of the *p. pinea* or stone pine, and I have no doubt forests of it existed in time of the Moors. It is still called, in that district, *pino real*, probably from the use made of the wood. *Pinos del Rey*, and *Pinos del Valle*, villages in sites no doubt named from local causes, are now without them, as is *Pinos del Puente*, on the outskirts of the Vega.

The Serrania de Ronda terminates the southern section of the forests. In the barrancos and river courses is *p. pinaster*, which is used at Marbella for smelting the iron ore. Mixed with it, but lower down is *halepensis*, and to the western side, I believe, the *pinea*. High up, on the most elevated ridges of the Serrania, is a species I have not been able to classify, and know only by the vague descriptions of the natives, obtained too late to enable me to visit the place. It grows on St.-Cristobal, and the Sierra de la Nieve, and is not improbably, from the description, *p. sylvestris*.

## SECTION

ACROSS THE CASTILES, BETWEEN VALENCIA AND GIJON.

The *p. halepensis* is found on the sands of the Albufera to the very brink of the Mediterranean, and

extends probably uninterruptedly across the Sierra de Cuenca, in following the course of the Xucar. Above it, on the southern verge of the Sierra, I have every reason to believe, is the *p. Hispanica*, as before stated, and on the north side, are the *p. pinaster*, and *sylvestris*. The Alcarria, and district near the junction of the Tagus with its great western branch the Guadiela, where there is a considerable mass of pine, has to my knowledge no other species than the *halepensis*. This locality, in the vicinity of Sacedon, is, as far as my observation extends, the northern limit of this species, as the Sierra de Cuenca is the southern limit, certainly in Europe, of the *sylvestris*.

Reaching the foot of the Guadarrama, which is in the line of section, the *p. pinaster* is seen, forming the lower zone, but has nearly disappeared, and above it is a vast mass of *sylvestris*, which forms the noble forest of St.-Ildefonso, and no doubt the same order prevails in those of the Tietar, in the neighbourhood of Talavera and in the same range; where pitch and tar are made in considerable quantities.

It will be observed that the same order exactly, prevails on the opposite at sides of the plain of New Castile, in ascending the Sierra de Cuenca and Guadarrama. After crossing this central range, the scanty remains of forest in old Castile, between the Guadarrama and Valladolid, are of the *pinea*, according to information I have received. In approaching the chain which divides Leon from Asturias, the oak, *q. prasina?* is topped by the beech, which is at the Puerto of Pajares, on the road to Oviedo, and below it on the other side of the range, are other oaks, elms, and chesnuts to the sea. I could not ascertain that any pines exist in the elevated range of

Asturias, the beech occupying, as in the Abruzzi, the highest level. The *p. pectinata*, which is next in the series, does not appear until you reach the western Pyrennees.

The districts not included in these sections are, Catalonia, in which, from the coast as far as my observation has extended, there is only the *halepensis*, which is in large quantities, every hamlet and village having a proportion, which would be much more valuable, but from the barbarous practice of polling, or cutting off the branches, so fatal to the fir tribe, and which completely defeats the purpose meant to be obtained by it, of procuring a larger quantity of timber on a given extent of ground. There are said to be three kinds of pine on Monserrat, but they escaped my observation, the more easily, as it is impossible, in the manner the trees are cut, to distinguish a species from individuals with only a small bunch of branches at the top of a trunk twenty or thirty feet high. It is not improbable that the *p. Hispanica* may be found in the upper region of the mountain, and a desideratum in this part would be to follow the line from the coast to the forests of *p. Hispanica* on the Essera to ascertain, which I have not had the opportunity of doing, whether there be a species or more interposed between the *halepensis* and *Hispanica*, in ascending from the coast level.

In the Pyrennees, on the confines of Aragon and Navarre, and on the river which gives the name to the former kingdom, is a valley named Roncal, which produces the timber used at Zaragoza, and which they assured me was of excellent quality. I could obtain no certain information about the species of the tree, which is most probably either *uncinata* or *sylvestris*, most

likely the latter. The adjoining country, to the west, the Roncesvalles district, is clothed with the pectinata, like the opposite side of the French Pyrennees. Along the whole coast of the Tierra Caliente as far as the Serrania de Ronda, I believe no other species to exist than the halepensis. On the western coast of Andalusia are halepensis and pinea. The latter forms a forest, through which the old road passes from Utrera to Seville, which is still followed by horsemen and muleteers. In the Sierra Morena, I saw no native pines, but I believe the species which properly represents that region, and which is found cultivated, is the pinea, which probably extends into the southern provinces of Portugal. In lower Estremadura I am unacquainted with any pinares or pine forests.



JUNTA DE ANDALUCIA

P.C. Monumental de la Alhambra y Generalife  
CONSEJERÍA DE CULTURA

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FOREST SECTION ACROSS THE CASTILES.



- S. B. Sea of Biscay.
- a. Oak, chestnut, hazle etc, of Asturias.
- P. P. Puerto de Pajares.
- c. Beech.
- d. Oak of Castile, Q. Prusina.
- V. Valladolid.
- e. P. Pine, Stone Pine.

G. Guadarrama range.

- f. P. Silvestris, forming the upper zone of the range.
- g. P. Pinaster.
- h. Oak, Quercus Tosa, Encina etc.
- M. Madrid.
- i. P. Halapensis, Encina etc. of Alcarria.

g. P. Pinaster.

- f. P. Silvestris, of Val de Cabras.
- S. C. Sierra de Cuenca.
- k. P. Hispanica?
- h. P. Halapensis.
- V. Valencia.
- M. Mediterranean.

The distances from P. P. to G. and from G. to S. C. are shortened in order to present the section in one view.

The respective lines of vegetation of the pine as to altitude, established by these observations, give, in the ascending series, *halepensis*, *Hispanica*, *pinaster*, *pinæa* (in old Castile), *pectinata*, *sylvestris* and *uncinata*. The *pinæa* also occupies a much lower range in the flat of the Guadalquivir, where it is equal with the *halepensis*, thus varying its native habitats considerably. The value for economical purposes is nearly in the ratio of the ascent, the order increasing being, *halepensis*, *pinaster*, *pinæa*, *Hispanica*, *pectinata*, *sylvestris*, and *uncinata*.

It may be necessary to observe, that in naming these species, the only certain mode of distinction has been followed, which is that founded on the fruit or cones; the other characters of colour, of length of spicula, and other artificial methods, only tend to mislead, and even to the experienced eye, should be viewed with extreme caution. The difficulty of obtaining accurate information is so great as to be nearly insurmountable. The subject has been little attended to, scarcely at all, and the observations even of the translator of Linnæus in the imperfect state of knowledge of that period, in this department, only mislead.

It is far from being meant to be asserted, that the species in this vast country are confined to those in this list; it is possible more may exist, but they require examination and proof, and more than the idea held by many people in Spain; that every thing and every species is to be found on their soil.

In examining the forests, care must be taken not to be misled by local names, which are exceedingly varied in the different provinces, and often do not apply to species at all. In the Sierra de Cuenca, for instance,

they have a term applied to a tree in a particular state of foliage, and of stunted form, or what the French call "rabougri" in distinction from a sound and well growing tree.

#### ON THE OAKS.

The evergreen oak is one of the leading vegetable features of nearly all Spain. The native woods of Aragon, of the greater part of Catalonia, of the Castiles, Estremadura, Andalusia, Valencia and Murcia, are formed in a great measure of a species which has been little noticed, and has acquired an unfortunate appellation, that of Gramuntia, from having been observed in a remnant of a wood near Montpelier, which is a kindred soil and climate to the middle and southern regions of Spain. This species is quite distinct from the *q. ilex*, its nearest congener. The leaves are thicker, more rounded at the point, of a dull glaucous green, and the tree altogether of a more compact and less graceful form, than the Italian *ilex*. The great and essential difference however consists in the acorns, which are edible, and when in perfection, are as good or superior to a chesnut. To give this sweetness they must be kept; as at first they have a considerable taste of the tannin, like the other species, which disappears in a few days, and accounts for the scepticism of some writers, who assert that both sweet and bitter are the produce of the same tree, and that their sweetness is no character. These are the edible acorns of the ancients, which they believed fattened the tunny fish, on their passage from the Ocean to the Mediterranean; a fable only proving that they grew on the delicious shores and

rocks of Andalusia, which unhappily is no longer the case. Remains of them may however still be traced in the west, and they produced the celebrated salted meats of Malaga, and that vicinity. These are the bellotas, which Teresa, the wife of Sancho, gathered herself in La Mancha, where they grow in the greatest perfection, and sent to the Duchess, wishing, instead of their being only the best of their kind, they were the size of ostrich eggs. I have frequently seen them produced by individuals and offered to the company, as bonbons are in some countries, with a sort of apology for their small intrinsic value, from their size and flavour. This species is beyond question very hardy, I believe even more so than the *ilex* of Italy. It ascends the sides of the Sierras, in the inclement region of the centre of Castile, and in Aragon is seen within the limits of the *pinus sylvestris* and *uncinata*, as also in the cold and wintry valley of Andorre. The widest forests of it are now in Estremadura, where the best sausages, and other salted meats are made from the vast herds of swine which are bred in them\*. This species ought to be denominated *q. Hispanica*, instead of a weak and obscure name from a wood, which I have heard no longer exists, where the tree may possibly not have been a native, although the climate and soil of lower Languedoc very much resemble that of the two regions of Spain, to which this tree is confined.

The genuine *q. ilex* grows in the first or humid region, and alone would serve to indicate the difference of climate of that part of the Peninsula. It may be

\* This species and some others, both pines and oaks, may be seen at Malcolm's nursery, Kensington, where the forest trees are more attended to than is usual in those establishments.

seen in the neighbourhood of Bilbao, Santander, and in Asturias, where no doubt it was once much more abundant. The *quercus Hispanica* is not found in that division, but appears the instant you cross the boundaries assigned to it, nor is the *q. ilex* found in either of the other two. The habitats would indicate a dry climate as best suited to this valuable species.

A beautiful species was observed by Cavanilles, in the eastern part of the kingdom of Valencia, and named by him *q. Valentina*. A good plate is given in the *Icones plantarum*, which is unfortunately the only tree he has figured. He mentions it having the valuable property of ripening the acorns a month sooner than the other species. They are however bitter and fit only for animals. This species is not far spread. The district it was observed is in the Tierra Caliente, but I saw the branches of it in a *corral* in La Mancha near Valdepeñas, where it had been brought from the adjoining hills for fuel. This is a much colder country, and quite within the middle region, I believe it to be identical with the *quercus ballotta* of the catalogues, which is stated to be a native of Barbary, and has no doubt been named by some misapplication of the Spanish term *bellotas*, which means acorns generally. These evergreen oaks are termed in the country, *encinas*, to distinguish them from the *robles* or deciduous oaks, and the cork trees, which have the specific name of *alcornoque*.

This last species is spread through the Tierra Caliente in all its extent, but is most abundant in Catalonia and Valencia, whence the principal exports have been made. The forests of lower Andalusia are proceeding rapidly to extinction. A contract has lately been made for the extraction of a quantity of the finest bark from the Sierra

Morena, in the neighbourhood of Seville, where it has hitherto been allowed to pass unnoticed. The money resulting from this bargain, I have understood, was applied to building the new theatre at Madrid, but to show the manner in which business is conducted in these jobs; the contractors were compelled to take the inner bark as well as the outer, which forms the cork. This inner rind is only fit for tanning, and was an incumbrance to the parties, who had no demand for it, and were obliged to go abroad to seek for purchasers. The evil is, that the stripping it kills the tree, so that this contract, for the sake of a paltry, temporary gain, will be the cause of a national loss of a prodigious number of valuable trees. The form of this tree is much more beautiful than that of the encina, as it grows with more freedom, and, in the districts suited to it, attains a great height. It is little seen in the middle region, excepting in Estremadura, and in a wood near Talavera de la Reyna, where I believe it is mixed with the encina. I cannot positively assert it to be so, having passed it rapidly, but if it be, this is its northern limit.

A noble species is associated with the suber, in the neighbourhood of Gibraltar, where I met with it in ascending through a forest to the left of the common route to Cadiz, above Los Barrios. We were compelled to quit the road on account of the floods, which made the regular line impassable, and to scramble up amidst masses of sandstone, where it was growing with the suber, and rhododendrons, and other beautiful plants. This species, one of the finest of the European trees, and which has not yet found its way into our nurseries, was pronounced by M. Lindley to be the *quercus Australis* of Link. The leaf is very large and ovate, with small

indentures. The acorns might be easily procured, in October, or the beginning of November, from Gibraltar, where the species could be preserved, and gradually removed to a more northern climate. The *quercus coccifera*, or kermes oak, is found in vast quantities in the southern division, and as far north as near the central line of Spain, but I think it does not pass the Guadarrama range. There are said to be two kinds, but it is not improbable that the spray or young shoots of other species, which sometimes resemble it, may have caused this idea.

## DECIDUOUS OAKS.

The uplands of Castile, the Alcarria, and Guadalaxara districts, the neighbourhood of Leon and of Valladolid, at a corresponding elevation with that of the encina, offer an oak, thought by M. Lindley to be the *q. prasina*, of Bosc, but there is not an absolute certainty of it, and I never crossed any of these districts in the fruit season. Another species, somewhat similar in appearance, if it be not the *lusitanica*, grows on the flanks of the Sierra de Segura with the encina. At a parallel above these, on the Somosierra, at St.-Ildefonso, and on the Sierra Nevada, in ascending to the Barranco de San Juan, where it forms the upper zone of forest, above the encina, is seen the *quercus tosa* or tauzin, or its variety of *pubescens*.

In the Sierra de Morena, is found the *quercus egilops*\*,

\* I am indebted for this information to the padre Manos, of the Regius professor of botany at Cordova, who was omitted to be mentioned in the list of botanists for the Sierra-Morena

but it is rare, owing to a prejudice of the peasantry that it causes abortion in the brood mares.

The *quercus robur* is the most abundant, and almost the only species in the whole of the northern district, or first region, such parts at least as I visited. It extends through Navarre, Guipuscoa, Biscay, maritime Castile, and Asturias, but I never saw it in the middle region, where it is immediately replaced by the other kinds above mentioned. The oaks in the park or outer grounds of Aranjuez, are of this species, but they have evidently been planted, and whether from the soil not suiting them, or from over irrigation, are bad specimens of it. By a singular prejudice which we may well pardon, the oak for the sculpture of the cathedral of Pamplona, was brought from England, as mentioned in the sketch of that place, whilst it is the common species of the neighbourhood.

The other kinds in the northern region, are, the *tosa* and *pubescens*, rarely; and the variety, I am not acquainted with the name, mentioned in the account of the Pyrenees. I am ignorant of the species of deciduous oaks which grow in Catalonia, where there is a considerable quantity, having been in that country in a backward spring, before the leaves were sufficiently developed. There is also beech, which is exported, but I am not acquainted with the locality.

In an economical view, there is a lamentable deficiency in this catalogue. In the whole of the species enumerated in the southern and middle regions, it is doubtful if there be a single one which produces good timber. The best is the *escina*, which is heavy, and unfit for most uses, and is now unfortunately the only firewood in most parts of Castile, which is hourly dimi-



nishing the scanty stock that yet remains. The mode of cutting increases the evil, the practice of the peasantry almost invariably being to level the whole tract which they attack. The consequence is that there is a tolerably vigorous spring from the stocks. This is soon cut, when a more feeble spring takes place, and is again levelled, after which operation being repeated a few times, every remnant is annihilated, and the country reduced to the open waste it now exhibits. In the oak tribe it is of vast consequence to leave standard trees, as the fruit is not blown about, and has a scanty power of vegetation, which is soon lost by exposure to the air. The acorns fall in a mass underneath the tree, where they are soon devoured by various animals, or spring in situations where they cannot thrive, whilst the seeds of the sycamore, or ash or pines, are transported by the winds about, and have infinitely greater chance of being perpetuated. The ash grows along the foot of the Guadarrama range, but not farther south, to my knowledge. The elms, and poplars, and other trees of similar description are not intended to be noticed, being of little value, compared with the more important species enumerated.

Should it be intended seriously to establish woods and forests in Spain, which must be done before any regular improvement can take place, the quercus cerris, and probably the Apennina, and sessiliflora, which grows in the kingdom of Naples, ought to be introduced in the southern and middle provinces, and above all the larch, of which the value is quite unknown, and for which they have vast tracts of waste peculiarly suited.

It will be easily seen that naval resources for building may be said not to exist. With the exception of a small

quantity of the q. robur in the northern provinces, only to be obtained with great difficulty, and expence, there is in the wide range of this magnificent country, absolutely none available for such purposes.

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JUNTA DE ANDALUCIA

P.C. Monumental de la Alhambra y Generalife  
CONSEJERÍA DE CULTURA

## CHAPTER XXIV.

### Ornithology.

In the ornithology it is impossible to find assistance in the country, and very little information is to be obtained from natives or foreigners. Neither public nor private collections exist, and I never met with an individual who had attended regularly to the subject. No written account is to be found, and I entered the country without the actual local knowledge of a single species, and no other proof need be given of the paucity of information, than the imperfect and scanty notices of Temminck, where this country is spoken of. I sought in vain at Madrid, Paris, and London, in the public libraries, for the work quoted by him as the *Fauna Aragonensis*, and I never saw a list of Spanish birds in any language. The royal cabinet at Madrid contains scarcely any thing. An individual there, has a few specimens of birds found in the neighbourhood, very well set up by himself, but he was ignorant of their names, and so indifferent on the subject as to decline my offer of supplying them. This was the only thing I met with deserving the name of a collection. I have followed the nomenclature of Temminck, to whom the European ornithologist is so much indebted. It is needless

to observe that the *habitats* are those which fell under my own observation, and are not meant to convey the idea of the species being confined to those localities.

The plan has been followed of going down the orders, as preferable to arranging them by localities, which would have made it less clear and intelligible. The native names are not given, or account of their varying so much in the provinces, that only error would have resulted from it. In the quadrupeds and reptiles, the means are yet more scanty of obtaining information, and the same cause only which induced the making public the ornithological notices, induces me to offer these.

#### VULTURE.

The great ash coloured vulture, v. *cinereus*, is common in new Castile, where it is called the Franciscan vulture, from its colour resembling that of the habit of these monks.

#### THE TAWNY VULTURE.

*V. fulvus*, is in great numbers in Andalusia. Its favorite haunts seem to be the mouths of rivers. They are very numerous at Malaga, and I have seen them in the interior, on the great plain of Antequera. They breed at the back of the rock of Gibraltar, but no doubt chiefly in the lofty range of the Serrania de Ronda, and at Ape's hill. I have understood they are also to be seen in Castile\*.

\* The species alluded to is tawny, with dark tips to the wings. Whether it be the true *fulvus*, or the *Indicus*, I am ignorant, never having seen it, but on the wing.

## THE CATHARTES PERCNOPTERUS.

The small or Maltese vulture, of which a young bird was shot in England in 1828, is in great numbers near Seville. They follow the plough in the manner of rooks, picking up the grubs, etc.

## THE GYPAETES BARBATUS.

Or great Alpine vulture, is not uncommon in the Pyrennees, but I never heard of it in the interior.

## FALCO.

I have never seen the first division of the falcons in Spain, but no doubt they are found in the Pyrennees, or Sierra Nevada.

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THE F. ESALON.

Stone falcon, is common in the mountainous parts of the south, and is probably spread over great part of Spain.

## F. TINNUNCULOIDES.

In the southern and middle regions, the beautiful species of *f. tinnunculoides* is found in vast numbers. They live in the cities, breeding in the lofty towers which have replaced the minarets of the Moors, enlivening the air with their loud notes, which are less dissonant than those of their congener the *tinnunculus*,

which they represent. They are in great numbers in the Giralda of Seville, and in all parts of the city. They remain long on the wing, in the manner of swallows. In the day time they may be seen chasing the beetles about the *palmetos*, or carrying off mice from the *cortijos*. They appear to have some attachment to each other. A very old male I shot on a cliff near Malaga, fell wounded, and scrambled to some distance; his female hovered close over him, shrieking and expressing the most lively interest in his fate. I never met with them in the northern region, where I suspect they are replaced by the *f. tinnunculus* or common kestrel, which is not seen in the other divisions. The most northern point I noticed them was at Toledo. I have never seen the real eagle in any part of Spain, or in the Pyrennees, although they no doubt inhabit part of them, but as I was two years successively in every part of the latter chain, without once observing them, they cannot be numerous.

THE F. NISUS.

Sparrowhawk, is seen in various parts of the country.

THE F. MILVUS.

Common kite, may be seen in the central parts.

THE F. CYARGUS.

Hen Harrier, is common about Granada, as it is at Rome; thus extending its range very widely over Europe.

## THE OWLS.

## STRIX FLAMMEA.

White owl, is common in most parts of Spain.

## STRIX BRACHIOTUS.

Short eared owl. In Castile.

## STRIX BUBO.

Great eared owl. Common in the Guadarrama range, and I believe also in the Serrania de Ronda. The latter may be the variety lately observed, differing as I have understood from the genuine bubo of the north.

## STRIX SCOPS.

Common in the centre and southern regions.

## CORVUS, CROW.

## C. CORAX.

Raven, common all over Spain, especially near Granada, and the Sierra de Cuenca, and is seen in the northern provinces. On the road to Cuenca in a small defile was a nest which some hungry peasants were despoiling of the full fledged brood, in order to feast on these savoury morsels. They had calculated to a day the time, necessary to take them as they made their escape from the nest, but could not rise from the

ground. The old birds came from a great distance on hearing the noise of the young ones, who were aware of their danger before the man who descended the cliff reached them.

C. CORONE.

Carrion crow. In the north and south, in Asturias, and at Baza.

C. FRUGILEGUS.

Rook. In old Castile only, near Valladolid, where they probably breed in the pine forests, to the south of that city.

C. MONEDULA.

Jackdaw. In the central region and in the Sierra Morena, where they are seen in small flocks, being apparently expelled from the ruins by the Roller.

PICA, MAGPIE.

P. PICA.

Magpie. Common throughout Spain.

P. CYANEA.

Blue magpie. This beautiful species, which is so rare, as to have escaped the notice of Temminck, is common in new Castile, in the wooded parts, and is in vast numbers in the Sierra Morena, where they destroy the



fruits to such a degree, that a premium is given for their eggs. As the species is to be found in very few books (I have only seen it described in Wagler, besides Pallas, who, I believe, discovered it in Siberia), the general description is subjoined. They live in small flocks, generally spread into a line, are extremely watchful, and are constantly moving, in short flights, commonly in cover, feeding on the roads, or as food may offer. The head is black, the wings and tail light blue, breast and under body dun or dirty white. The body is small, the wings short, tail extremely long, and motions sprightly, like those of the common species.

I believe their range to be confined to the districts above mentioned:

## C. GLANDARIUS.

Jay. Very common throughout Spain.

NUCIFRAGA CARYOCATACTES.

Nutcracker. In the Pyrennees.

PYRRHOCORAX PYRRHOCORAX.

Alpine crow. More common in the Pyrennees than in the Alps. They live in common with the Chough.

PYRRHOCORAX GRACULUS.

Cornish chough. In the Pyrennees, on the north coast of Spain, in the Sierra de Baza, and at Cuenca, thus covering the whole range of the country.

## CORACIAS GARRULA.

Roller. This beautiful species, which connects in plumage the European birds with those of the tropical regions, is common in Castile, and Estremadura, but most so in lower Andalusia. They are in vast numbers in the ruined villages along the Guadalquivir, and in the Moorish castles, occupy the place of the jackdaw. They appear in April. I never saw them in the winter. They are sociable, living almost in the houses, and are not shy and solitary, as described in the books, which represent them frequenting the deepest recesses of the forests. They breed in the walls of the castle at Alcala de Guadaira and other places in the vicinity of Seville.

## ORIOIUS, GALPULA.

Golden oriole. Common in the Sierra Morena, and in new Castile; migratory.

## STURNUS VULGARIS.

Common starling. Common throughout Spain, where the situation suits them. In vast numbers near Seville and Xeres. They are taken by nets in the former district, in caves, which they enter for warmth in winter.

## STURNUS UNICOLOR.

Purple starling. This species, which I believe has

not been noticed on the continent of Europe, is very common in Castile, in Estremadura, and in Andalusia. They live in the decaying villages along the Guadalquivir, and are abundant in the city of Seville, breeding about the public buildings and convents. They are generally in small flocks, never with the other species. Their habits are just the same; their cry less harsh.

## LANIUS. SHRIKE.

*Lanius meridionalis*, which might be termed the Spanish Shrike, as it is almost peculiar to the Peninsula, is in great numbers in Andalusia, and inhabits also Castile. In the former province it is stationary. It is, I believe the only European species which does not emigrate, and Spain is the only country where it hibernates.

## LANIUS RUFUS.

Red headed shrike, arrives in vast numbers at the end of March, and spreads over the country, very many remaining in lower Andalusia. I never met with the other species, but they are most probably in the northern provinces.

## MUSCICAPA, FLYCATCHER.

*Muscicapa grisola*. Spotted flycatcher. In Castile.  
*M. Luctuosa*. Pied flycatcher. In Andalusia.

## TURDUS, THRUSH.

## T. VISCIVORUS.

Missel thrush. Is in great numbers in the south of

Spain, in those parts where the locality suits them. These birds, with many others, are compelled by circumstances to use food very different from their habits in other countries. One I shot in the forest of Macael, late in the autumn, when berries ought to have been its food, had the crop filled with bees.

## T. PILARIS.

Fieldfare. Is rare in Andalusia, but probably in the northern and middle regions is not so, in the winter. I found it at the Fuente de Segura, where it was evidently a resident, in November.

## T. MUSICUS.

Thrush. In vast numbers in the lower parts of the Sierra Nevada, and in the north of Spain, as no doubt in almost every wooded district.

## T. ILIACUS.

Redwing. In great numbers in the Xeresano, lower Andalusia, in the winter. They probably breed in the Serrania de Ronda.

## T. TORQUATUS.

Common in the high Pyrennees, and in the northern provinces, in the high districts.

I never met with the rare species, *atroglaris* or *naumanni*.

## T. MERULA.

Black bird, Abundant wherever they find shelter.

## T. CYANEUS.

Blue thrush. Common near Granada, Malaga, Ronda, and Gibraltar, and I saw it near Cape Peñas, the northern extremity of Spain; thus extending its range from the two extremes of latitude, and it probably may be found in the woody parts of the middle region.

## T. SAXATILIS.

Rock thrush. Rare in the Pyrennees. I once saw it near Malaga, and between Pamplona and Vittoria.

## CINCLUS AQUATICUS.

Dipper. Common in the high Pyrennees, and in some of the higher Sierras in different parts of Spain.

## SILVIA.

Of the *Sylvia* my list is incomplete, from the time necessary to be resident in every place, and the difficulty of procuring specimens.

## S. TURDOIDES.

Common in new Castile.

## S. SUECICA.

In the neighbourhood of Madrid.

## S. LUSCINIA.

Nightingale. In vast numbers, but not stationary, even in Andalusia.

## S. MELANOCEPHALA.

Very abundant, wherever there is cover, in Andalusia, and in the Tierra Caliente, to which region they are nearly confined

## S. CINEREA.

Common near Seville.

## S. CONSPICILLATA

For which there is no English name. This beautiful species had not I believe been previously observed on the continent of Europe, but since my return, I have been informed by the prince of Musignano, to whom I imparted the fact of their living in Spain, that about the same time he had observed them near Civita Vecchia. They are stationary in Andalusia, frequenting in low and moist situations, and I suspect not much extended in their habitats. I found them in the marshy plain above Seville where they live with the cinerea and may easily be mistaken for them.

## S. PROVINCIALIS.

Dartford warbler. Extremely abundant all through the south. In the arid deserts of the Tierra Caliente

the instant water is found in the barrancos, the oleander appears, and the sprightly form of this tiny species, gives a little life to the scene.

## S. RUBECULA.

Red breast. In vast numbers through the whole of Spain.

## S. TITHYS.

Black redstart. In great numbers in the southern region, where they are stationary, They chiefly inhabit the gravelly beds of torrents, and have the habits of saxicola. They are very numerous about Granada and Almeria. They seem, like some other species, to be sedentary only in Spain. In the supplement to the "specchio" of the prince Musignano, they are said not to remain at Rome in the winter.

## S. PHENICURUS.

Not so common as the other species. It emigrates. I have seen it in Andalusia in the spring, and in old Castile. It is no doubt, more abundant in the northern region.

## S. HIPPOLAIS.

Common in most parts where they find shelter.

## S. CISTICOLA.

This species, which was discovered in Portugal, I sought in vain in Andalusia, never having seen a single

specimen, although I have passed vast tracts suited to it. The name is unfortunate, for at Rome, where they are abundant, they inhabit the marshes of Ostia, or the spots of broom of the campagna, where there are no cisti.

S. TROGLODYTES.

The *s. troglodytes* is very common.

SAXICOLA STONECHAT.

The vast stony wastes, which occupy so large a portion of the territory of Spain, are suited to the habits of these birds, and they abound in every part.

S. CACHINNANS.

Black stonechat, one of the European species the least common, is in very great numbers in the southern district, especially in Murcia and Granada. They are numerous on the sea coast, and to the limits of the great southern secondary range. I never saw them in the Sierra Morena, or beyond the line of Jaen and Cuenca. Their habits are entirely of *Saxicola*. They seem to prefer the driest parts of the white limestone. They are in the habit of entering fissures of the rocks in search of shelter or food, and often dart to them when wounded, like rabbits. I lost three, which were wounded by a single shot, near Vera, in this manner. The only part of Europe they are known to inhabit besides, is the maritime Alps, where they are exceedingly wild. In Spain they are quite the contrary, coming almost into the houses, and may be seen in the Moorish citadels



at Malaga, Jaen, Almeria, etc. Their dark plumage, with their lively and constant motion, give life to many dreary districts. They are certainly more abundant on the limestone, but are not by any means confined to it.

## S. OENANTHE

Common throughout the whole range of Spain.

## S. STAPAZINA.

Common in new Castile, and in the higher parts of the Sierra Morena.

## S. AURITA.

In new Castile, between Madrid and Tarancon\*.

## S. RUBETRA OR RUBICOLA.

In great numbers all through Spain. I believe both species are stationary.

## ACCENTOR.

## A. ALPINUS.

In great numbers in the Pyrennees, and they are seen on the coast near Alicante.

\* If the idea of the Italian ornithologists be correct, that the aurita is the young of the stapasina, the rule of numbers is inversely to the usual proportion, for the aurita are by far the more rare, in Spain at least.

## A. MODULARIS.

Hedge sparrow. Common where there is shelter.

## MOTACILLA, WAGTAIL.

## M. ALBA.

Common wagtail. Extremely numerous in the central region. Like some other species in this country, its habits appear to be modified by local situation. It is abundant in the driest and most arid parts of Castile, and in places the most opposite to its usual habitats.

I have sought in vain, as in Italy where I have examined many thousands, for the *M. lugubris* of Temminck.

## M. FLAVA AND BOARULA.

Not uncommon throughout the country, but much less so than the preceding species.

## ANTHUS, PIPIT.

## A. RICARDI.

Near Vittoria.

## A. ARBOREUS.

Tree pipit? The last bird seen in ascending the Sierra Nevada, as in the high moors of Northumberland.

## ALAUDA, LARK.

## A. CALANDRA.

Calander. Abundant in Castile and Estremadura. They are kept in cages, and are said to imitate the notes of other birds.

## A. CRISTATA.

Crested lark. When the traveller issues from the passes of Guipuscoa, and enters the arid parched plains of Castile, he meets this bird, which never leaves him, save at the greater elevations, throughout the middle and southern regions. They are in vast numbers. No site is too dry or barren for them, and they abound in the Tierra Caliente, where no trace of verdure is to be seen, and where the saxicolæ alone are to be found besides. They seem to prefer the roads, and rise under the mules' feet, with a monotonous whistle, making a short rising flight, and perching on the rocks, or shrubs occasionally.

## A. ARVENSIS.

Skylark. Common every where in the open country.

## A. BRACHIDACTYLA.

Lesser calander. In spring, in the southern and middle regions. They probably emigrate.

## PARUS, TITMOUSE.

This class is not common, but in the wooded and moister parts. As at Aranjuez, Valencia, and in the northern districts they are less rare.

## P. BIARMICUS.

The bearded titmouse is found at Valencia and at Aranjuez.

At the latter place, is the caudatus.

The ceruleus is thinly spread throughout the country.

## EMBERIZA, BUNTING.

## E. MELANOCEPHALA.

Near Ronda?

## E. CITRINELLA.

Common yellow hammer. In the north and middle regions.

## E. MILIARIA.

Very common, quite throughout to the extreme south.

## E. SCHOENICLUS.

In Aragon.



JUNTA DE ANDALUCIA

P.C. Monumental de la Alhambra y Generalife  
COMISERÍA DE CULTURA

## E. CIRLUS.

Girl bunting. In the southern region.

## E. CIA.

Lorrain or foolish bunting. Common near Malaga.

## CURVIROSTRA. CROSS BILLS.

In Castile, but I believe only on passage.

## FRINGILLA, GROSBEAKS.

## F. COCOTHAUSTES.

Grosbeak. Not uncommon in winter in lower Andalusia, where they probably descend from the Serrania de Ronda.

## F. CHLORIS.

Common.

## F. PETRONIA.

Which is so common in the south of Italy; I have never met with it in Spain.

## F. DOMESTICA.

Common sparrow. There are said to be three species in Europe. The common species of the north of Europe,

called the domestica; the Cisalpina or Italian sparrow, which I have seen in upper Dauphiny; and the other to which the name of Hispaniolensis was given, from its having been killed near Algesiras, by M. Natterer. These species were made known to the public by M. Temminck, and my attention was drawn, amongst others, to the curious fact of the existence of three varieties of the same bird, apparently modified by zones of climate. I studied the two first species in a former visit to Italy. In Piedmont both exist, and at Turin the domestica is abundant. Both are found at Florence, but the Cisalpina is the most common. South of that city I never saw it, and at Rome there is no other species than the Cisalpina. With these data I examined the greater part of Spain. I particularly looked at the species in the south, at Cordova, Ecija, which is the hottest place in Spain, Seville, Cadiz, Malaga, Velez Malaga, Granada, Valencia, and other places, and never saw an individual in any of them, excepting of f. domestica. I shot the darkest individual out of a flock, within a league of Algesiras, whence the species was said to have been brought, which was equally of the common sort. It is probable that the individual, which caused this mistake, had been blown over from Africa. At Gibraltar also, the birds I saw, were all of the common species. There are some individuals with the chesnut over the ears, carried over the region of the occiput, so as to narrow the vinous colour very considerably, but these are merely varieties, and are of comparatively rare occurrence, and I am forced to the conviction, that no other species than the domestica, or common house sparrow, of the north of Europe, exists in the varied climate of Spain. If the Cisalpina exist, it is in Catalonia, which I did not examine

in detail, but I have not the slightest reason to believe it is.

## F. SERINUS.

Serin finch. Common in Andalusia.

## F. CELEBS.

Chaffinch. Not uncommon, but not in the prodigious numbers which visit Italy in the winter, and I saw nothing like migratory arrivals.

## F. CANNABINA.

Redpole. Not uncommon in most parts of the centre.

## F. CITRINELLA.

Citril finch. In the centre and south.

## F. LINARIA.

Lesser redpole. Common in the centre.

## F. CARDUELIS.

Goldfinch. In prodigious numbers in the uplands near Granada, in the Sierra Morena, and lower Andalusia.

## CUCULUS SONORUS.

Cuckoo. Common, but I believe not stationary.

## PICUS, WOODPECKER.

Woodpecker. In all the wooded tracts, in the Sierra

de Segura, Cuenca, and Morena, but I am unable to give any account of the species.

P. MARTIUS.

The great black woodpecker is found near Bagneres de Luchon.

YUNX TORQUILLA.

Wryneck. Common in lower Andalusia.

CERTHIA, CREEPER.

C. FAMILIARIS.

Lower Andalusia.

TICHODROMA PHOENICOPTERA.

Wall creeper. Common in the Pyrennees, but I never saw an individual in the interior of Spain.

UPUPA UPOPS.

Hoopoe. In vast numbers in lower Andalusia, and not uncommon in Castile and Aragon.

MERIOPS APIASTER.

Bee eater. Arrive at the end of March in vast flocks, and spread over the greater part of Spain, where they are the terror of the proprietors of bees. These beautiful birds are most numerous along the Guadalquivir, and its tributaries, the sandy banks of which afford them breeding places. The old birds are almost constantly



on the wing, with a very sonorous whistle, and a jerking or wheeling flight, no doubt intercepting their prey on the passage to their nests.

## ALCEDO HISPIDA.

King fisher. Abundant in Andalusia. They may be seen in the stream which skirts the paseo de Maria Cristina, at Seville.

## HIRUNDO, SWALLOW.

## H. RUSTICA.

Chimney swallow. A few of these birds winter in the south of Andalusia. I saw them on the summit of the Lomo de Vaca, far from the haunt of man, living with the *h. rupestris*. In the southern provinces, they sometimes live in the posadas, their nests being built on the rafters, where they are shut in every night, thus shewing that their apparent partiality for the habitations of man proceeds neither from the want of warmth, as has been asserted, nor is the effect of natural inclination; habits quite irreconcilable with either of those theories, prevailing.

## H. URBICA.

House martin. Abundant in most parts, but I never saw them in winter. At Puerto Santa Maria, near Cadiz, they had commenced operations on the first of March. They breed in the Pyrennees in the rocks, in vast numbers, as in the Alps, often far from the habitations of man.

## H. RIPARIA.

Sand martin. Not common. I have seen them on the Guadalquivir.

## H. RUPESTRIS.

Rock swallow. Winter in great numbers along the southern shore, and at Gibraltar and even Ronda which is much colder. At Malaga, they live amongst the houses, at the Alcazaba, and have the habits of martins. I should imagine the whole of them hibernate, which is not the case with the rustica. There are a few in the Pyrenees, and spread over Spain, but they are most numerous in the great range of the southern coasts.

## CYPSELUS ALPINUS.

Were living at the Breche de Roland, skimming the glaciers in July. I could not ascertain whether they bred in the mural precipices there, or below in the villages. I never saw them in Spain excepting at Merida, where they were in April, in company with innumerable martins and others of the tribe, flying very low, with a note not unlike some of the terns. When high in the air, as I have seen them in descending the Rhine, they have a loud and melodious whistle. I have heard they were not uncommon in Catalonia, but I never met with them, probably from their habit of going to feed at vast heights and distances in the day time, which prevents them being seen. They arrive at Naples at the end of March, and then fly low. I believe they depart early.

## C. MURARIUS.

Common swift. In prodigious numbers all over Spain.

## COLUMBA, PIGEON.

## C. PALUMBUS.

Ringdove. In the Sierra Morena and Sierra de Cuenca.

## C. OENAS.

Stockdove. In great numbers in passage in the Spanish Pyrennees.

## C. TURTUR.

In vast numbers. They emigrate in spring and autumn by the western foot of the Pyrennees, and are taken in great numbers at Bayonne.

## TETRAO.

## T. UROGALLUS.

The cock of the wood, is found in the Pyrennees, but rarely, from the comparative extinction of the forests.

## T. TETRIX.

Black cock. Does not appear to exist in any part of the Peninsula, or in the Pyrennees.

## T. BONASIA.

Gelinotte. Near Bagneres de Luchon; but I never heard of it in the interior. If any where, it must be sought for in the first region.

## J. LAGOPUS.

Parmigan. Common in the Pyrennees, but I believe is not found in any other part of Spain.

## PTEROCLES.

These birds, to which the name of Ganga has been applied as a generic instead of a specific name, are in abundance in Spain. The larger species abounds in both the Castiles, and Estremadura, and less in Andalusia. I believe it is also common in Aragon. It is named *ortega* in Spain. It is a very strong bird, especially on the wing, the muscles of which are excessively strong and the skin of extraordinary thickness and toughness.

The other or white breasted species, which is also found at the foot of the Pyrennees, in Languedoc, is called *ganga* in Spain. They are extremely numerous in Andalusia, and in most parts of the open country of the interior. They are taken chiefly at night by a destructive poaching method, as neither species will allow dogs to approach them, and are difficult to get at. The only shots I ever got were by marking them, then riding up, and firing off horseback, a mode easily practised with the light and docile horses of Andalusia. According to the best accounts I could collect, they lay only two eggs,

and I suspect frequently only rear one young one, as I often saw parties of three. Both species congregate in the winter, especially the ortega. The gangas are much better eating than the other species, which requires the skin to be taken off, before it is prepared for the table, as it is otherwise tough and dry.

## PERDIX FRANCOLINUS.

Francolin. I have never seen this bird, which is said to be brought occasionally to Gibraltar, but I suspect it to be the ortega which they term francolin.

## P. RUFA.

The perdix rufa is the universal, and I believe the only species in Spain. They are in incredible numbers in parts of Andalusia, especially in the Sierra Morena. They are destroyed throughout the year, without any sensible diminution in their numbers. Bowles, in the middle of last century, describes the people making omelettes of their eggs in upper Andalusia.

Within a few miles of Seville, at the end of the season, where they are destroyed in every possible way, they were swarming. I have never seen the bartavelle, *p. saxatilis*, nor the *p. petrosa*. The latter is said by Temminck to inhabit Spain, but I have examined prodigious numbers without seeing it, and it appears very doubtful if it exist on the continent of Europe. There is in the Museum either at Turin or at Geneva an individual, said to have been killed near Genoa, but I was assured there, that none such existed in those mountains, and it was probably the accidental arrival on

the coast of an individual blown off from Sardinia or Corsica.

P. COTURNIX.

Quail. In vast numbers I believe all over Spain.

HEMIPODIUS TACHYDROMUS.

Hemipodius or Andalusian quail. Near Cadiz and Gibraltar, but I have never seen the variety called Gibraltaricus.

BUSTARD.

The great bustard is in vast numbers, in most of the middle and southern plains; especially in new Castile, Estremadura and Andalusia. In the winter there are great numbers in the delta of the Guadalquivir.

The smaller bustard is abundant almost every where. I never saw the houbara, which appears to be only an accidental visitor.

OEDICNEMUS CREPITANS.

Thick kneed plover or bustard. In great numbers near Malaga, and other parts of Andalusia.

CHARADRIUS PLUVIALIS.

Plover. In vast numbers in the winter in Andalusia. There is more difficulty in giving information respecting the aquatic birds. It is impossible to obtain either specimens, or acquire intelligence concerning them. It is of less importance, because, with the exception of a very few species, they consist of the varieties

which pass through nearly every part of Europe in the spring and autumn. The best districts are the mouths of the Guadalquivir and of the Ebro, the marshes of Murcia, and the lake or lagune of Albufera, in Valencia. This last is a large expanse of water, the haunt of innumerable wild fowl during the winter. It is a royal demesne, but is farmed out, and there are two days, called "entrada general", when every one has the privilege of shooting. One of these days is in November, the other I think in February, previous to the departure of the birds. On these days, especially the first, I have understood a prodigious slaughter takes place, and it would certainly repay any naturalist who could be present at the time. I have heard there is an equal quantity of aquatic birds in Murcia in the winter.

Amongst the rarer species, the ardea garzetta, small egret, abounds in the western coast of Andalusia, and is seen on the mudbanks in Cadiz harbour.

The taleve or porphyron most probably may be found in the rivers of Andalusia, when examined, the flamingo, phœnicopterus, is found both in Andalusia, and in the Albufera. The stork inhabits the south of Spain, especially Estremadura, in vast numbers. It migrates, but returns very early.

## MAMMALIA.

### QUADRUPEDS.

The bear is not uncommon in the Pyrennees, but it is very doubtful if it be found now in any other part of Spain. having vanished with the forests. I enquired in every part, but never ascertained that it really exists.

A story was current of one having been seen, near St.-Ildefonso, some years back, but it turned out to be a capuchin with his cowl over, at his matins, kneeling, which figure and colour are by no means unlike the animal in question. The forest which occupied the site of Madrid abounded with them three or four centuries since. The last were killed in the Serrania de Ronda, in the sixteenth century. They might be expected to be found in Asturias, but the people assured me they were no longer met with.

## MUSTELA.

Martin. I saw a specimen lately taken in the Pyrennees, in a village between Bagneres de Bigorre and Luchon.

## CANIS.

## WOLF.

In vast numbers in all the forests of Spain. They abound in all the regions where there is shelter, but are most numerous in the Sierra Morena, where they are so abundant that only the utmost vigilance of dogs and men can preserve the flocks. A proprietor whose dogs had by some accident been inattentive, lost in one night eighty sheep, near Cazalla. An incredible number have been killed in the battues in those districts when well managed. They are equally numerous in the Sierra de Segura.



JUNTA DE ANDALUCIA

P.C. Monumental de la Alhambra y Generalife  
CONSEJERIA DE CULTURA



## FOX.

The fox is found in great numbers in every part of Spain, probably of more species than one.

I failed in ascertaining whether the ferret, which is always said to be wild in the south of Spain, really be found there or not. I never obtained any satisfactory information on the subject, and believe it does not exist in a that state.

The pointer seems to be the only species used for the gun. They are in every part, and excellent. Those of Ronda and of Navarre are celebrated, the last breed being I believe more difficult to break.

There is a species of spaniel which I believe is native and appears well bred, but I never saw them in use. Besides the greyhound, which is an excellent sort, there is a species of lurcher, called *podenco*, which is very much used in Castile for hunting the rabbits and hares. In the Sierra Morena they have strong and excellent sheep dogs which are capable of attacking a wolf singly.

## FELIS.

## LYNX.

The lynx is not uncommon in the central chain, and abounds in the Sierra Morena. I am ignorant of the species of that in the centre, but the other appears to be identical with the *felis pardina* of Oker and Temminck, excepting that the tail is very short. The skins are brought to Seville, and sold to make the short jackets so much worn in Spain, but I could never procure one quite

perfect. One nearly so was sent to the British Museum. They live chiefly on the rabbits and partridges, which swarm in the country. There are said to be two kinds, but I never saw more than the spotted sort, the skins of which are very beautiful, especially the old ones. The other species if it exists, must be the wild cat. The lynx here mentioned, is termed in the country *gato clavo*.

F. CATUS.

Wild cat. The enormous animal mentioned as having been seen at Priego, near Cuenca, is the only individual which came under my observation. It differed from any one of the species I have seen before or since, having subsequently seen the cabinets of London, Paris, Rome, Munich and Geneva. The ears were short and rounded, having an appearance like those of an animal which had been cut, which the others have not. The size was at least double any one I ever saw. There was a broad black band on the middle of the back, and a smaller on each side; also on the head. The lower part was the peculiar reddish grey of the fox. The head was very large, the teeth disproportionably small, the strength of course being in the arm. The tail was tipped with black. I am quite satisfied it was a different species from the others, which are very numerous in the collections above mentioned.

The marmot is not found in the Pyrennees, where it might easily be introduced, nor I believe in any part of Spain.

The wild boar is not uncommon in Castile, and in the Sierra Morena, and Estremadura.

## CERVUS.

The red deer is said to be yet in Asturias, but I never saw a specimen. It is not improbable, from the similarity of the country to its habitat of Exmoor. The common deer of Spain, of which species I am ignorant, abounds in the centre, and especially in the Sierra Morena, where they are destroyed in great numbers in the battues.

The roebuck is found in all the extent of the country wherever there is forest. It abound in the Sierra de Segura.

A wild goat is found in the Sierra de Segura, but I could not satisfactorily ascertain of what species.

The bouquetin or ibex is still on the south side of the high Pyrennees, but in small numbers, and I have had testimony sufficient to prove their existence in the Sierra Nevada, but I could not procure a specimen at Granada, where I was assured they are brought by the chasseurs occasionally.

The chamois is found in vast numbers in the Pyrennees, I believe of the same species with that of the Alps, but it is not, that I am aware, in the interior, unless the goat of the Sierra de Segura be identical with a variety which lives in the forests in some parts of the Alps. The hare is in vast numbers in every part of Spain, where they are destroyed through the whole year. In Castile they are extremely strong, and afford excellent coursing.

The rabbit is in countless numbers in the Sierra Morena, and all over the country where there is shelter for them. They are, as is well known, the parent stock

of all Europe. The fur is a darker iron grey, but I noticed no other difference from our own, their habits being precisely similar to those of the species in the north of Europe.

### REPTILES.

The lizards are in prodigious numbers in the south, especially in lower Andalusia, where the large green sort, and one, of equal size, of a deep purple and brown, nearly as beautiful as the other species, also bounds. In the Tierra Caliente, I noticed a very small species with a short tail, which very often appeared. Whatever be the cause, they always moved in a parallel direction to the road, keeping by the side of it and running with incredible celerity.

The snake tribe, if I may judge from my own observation, as my pursuits led me very much to the places they usually haunt, are not numerous. They are said by Cavanilles, to abound in the eastern part of Valencia.

A species is said to be found in the vale of the lower Guadalquivir, called by the local name of *antar*. I am quite ignorant of the species, but from the tales of many natives, who assert that it is of small size, and extremely venomous, whilst others say that it is very large. I believe it to be wholly fabulous. The name is quoted from memory, but I believe it to be correct. Whatever it be, it is a Moorish word, and a critic, a most competent judge, told me the word had been inserted in the dictionary of the Academy by some Andaluz, and ought not to be there, as it was not Castilian.

I was witness to the activity of one of the species of

common snakes, in taking their prey, which could not have been excelled in the tropics. I was ascending the Lomo de Vaca, in Murcia, in a warm, sunny day, when I noticed a snake issue from some long grass in pursuit of a small quadruped. I instantly stopped the mules, got off, and hurried to the spot, where I arrived just as the reptile had come up with the chase, and was wriggling around it in an open coil, raised from the ground, which completely concealed the little animal. In a few seconds however, the folds were decreased, and drawn quite tight around the intended prey, which was either a dormouse, or one of the larger species of field mice. The poor animal was held in an upright position, the folds enveloping him to the throat, and then doubled back downwards. His bright eyes starting from their sockets announced suffocation to be close at hand. In this position I resolved to wait until it was over, and then take them both. Unluckily I had called to the guide to shew him the sight. He immediately raised a huge fragment of schist with both hands which would have crushed them to atoms. I spoke to him to desire he would procure a stick, when the snake heard me. He put out his head from beneath the coil to reconnoitre, and in less than a second unloosed his hold, when both made off, at a rectangular direction to each other, and effected their escape into a heap of fragments, for which the mouse was making at the time of his capture.

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## CHAPTER XXV.

### Geology.

The following delineation of the geological features of Spain, as they have offered themselves in the various parts I have traversed, must be understood to have merely the object of communicating information on a country which in that more than any other is almost a blank, in the map of science. From the rapid manner in which many, of the observations have been made, more cannot be done, but it is to be hoped that it may be of use in guiding those who have more leisure, to give hereafter fuller details, especially in the important business of finding the fossils of the secondary ranges, which can only be done by time, and the assistance of native and resident contributors. It is to be hoped that in a few years the science may be, by the zeal and ability of those who direct it in the countries of Europe which are the most advanced in this important branch, by working from fixed data to a common end, put it on such a footing, that the arranging and classifying the formations, may be more easy and simple than it is at present.

To render the opportunities I had of seeing a country, which it is to be regretted so few people have visited, of those best fitted for the task, of some utility, there

were two methods; the one, of selecting spots or districts, and by close and diligent investigation of them, arrive at an exact knowledge, leaving the general delineation in the state it now is; the other, by a bolder line, to take a more general view, and describe what may be termed the geographical geology of the country. Many circumstances, unnecessary to enter into, induced me to prefer the latter, and the result, which is hoped may give some new information, is now offered, commencing by the central region.

The centre of Spain is traversed by a primary range of considerable elevation, which divides the Castiles, and I believe extends into Portugal. Its eastern termination I am unable to state exactly, but I apprehend it passes under the secondary formations, principally of sandstone, and other secondary strata, which form the lofty uplands of the Soria district in old Castile, and probably the continuation of the series observed between Madrid and Zaragoza. This range is of considerable elevation, forming a noble chain opposite to Talavera de la Reyna and the Somosierra and Guadarrama Sierras, opposite to Madrid. It might have been considered in the olden time as the spine of Spain, so important a feature does it constitute in the physical delineation of the country, and it is surprising it should have escaped that or some similar denomination.

The formations of the two Castiles are completely divided, in the western part, by this vast barrier. We shall first proceed with New Castile. At the foot of the range opposite to Madrid, which is principally granite, is a mass which I have not particularly examined, but it appears to be formed of the detritus of the older rocks, associated with marbles and gypsum, in which Madrid is pla-

ced. It also contains a curious magnesite, which occurs near the city, and a deposit of bones of the larger mammiferæ. The section is now carried across the country to Cuenca, by Tarancon. At Arganda, which is about three leagues from Madrid, appears a horizontal deposite of white limestone, associated with gypseous marle, and covering the heights of Perales, Villarejo, and Tarancon.

These gypseous marles belong probably to a separate formation. The soil from the limestone is excellent, that of the marle much inferior. Above Tarancon, on the route to the Sierra de Cuenca, the first feature which offers itself is a mass of rock gypsum, in regularly inclined beds, which rises to a few hundred feet, a considerable height in that part of the country. This is soon succeeded by appearances of sandstone, on which it seems to rest, and it finally disappears before reaching the elevated ridge which divides the waters of the Xucar from those of the Tagus. This ridge is red sandstone in horizontal beds, which reach to near Cuenca, when it is succeeded by limestone, which there is a tolerable certainty, overlays it. At Cuenca, nothing is seen but limestone, which forms what is called the Sierra or upper range. The sandstone may however be seen, passing underneath it, in the Val de Cabras at a distance of three leagues from the city, and there is no doubt that the whole chain in this part rests upon it, the sandstone lying mainly in horizontal beds. This limestone forms precipitous cliffs, of moderate elevation, in a line from Cuenca to Priego, in the gorge of which the stream has formed a considerable deposit of tufo, similar to those which will be mentioned hereafter in the southern provinces. From Priego the section crosses diagonally to Guadalaxara, passing by Sacedon. This country is