and the central tableland, and is divided by ranges of heights proceeding on the one side from the Pyrenees, on the other from the base of the Moncayo, into two portions. The uppermost of these, a plateau of between 1000 and 1300 feet above sea-level, is only about one-fourth of the size of the remaining portion, which is chiefly lowland, but is cut off from the coast by a highland tract connect­ing the interior tableland with spurs from the Pyrenees. The Guadalquivir basin is likewise divided by the con­figuration of the ground into a small upper portion of con­siderable elevation and a much larger lower portion mainly lowland, the latter composed from Seville downwards of a perfectly level and to a large extent unhealthy alluvium *(las marismas).* The division between these two sections is indicated by the change in the course of the main stream from a due westerly to a more south-westerly direction.

The main water-parting of the peninsula is everywhere near the edge of the tableland on the north, east, and south, and hence describes a semicircle with the convexity to the east. The Ebro alone of the great rivers flows into the Mediterranean. The following table gives the length of the principal Iberian rivers, with the area of their basins,—the length according to different authorities, the area of the basins according to Strelbitsky, whose measure­ments of area appear to be more trustworthy than those made by him of the length of rivers :—

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Length in English Miles. | | | Area in Square Miles. |
| Wagner. | Ritter. | Strelbitsky. |
| Ebro | 442 | 416 | 470 | 38,580 |
| Duero (Douro) | 452 | 507 | 485 | 36,710 |
| Tagus |  | 553 | 566 | 31,865 |
| Guadiana | 510 | 490 | 316 | 25,300 |
| Guadalquivir | 337 | 350 | 374 | 21,580 |

With the exception of the Guadalquivir, none of the Iberian rivers is of great service for inland navigation, so far as they lie within the Spanish frontier. On the other hand, those of the east and south are of great value for irrigation, and the Jucar and Segura in the south-east are employed in floating timber from the Serrania de Cuenca.

The Ebro and Tagus are described in separate articles *(q.v.).*

The Mino (Portug. *Minho,* the *Minius* of the Romans) is formed by the union of two small streams in the north of the province of Lugo, and flows first southwards, then on the whole south-westwards to the Atlantic, forming in the lower part of its course the boundary between Spain and Portugal. It becomes navigable for small vessels at Salvaterra, 25 miles above its mouth. Large vessels cannot cross the bar at its mouth. Its only important tributary is the Sil (left), which at the confluence is the larger river of the two.

The Duero (Portug. *Douro,* the *Durius* of the Romans) emerges from the rock as a small stream among the mountains of Urbion on the borders of the provinces of Logrono and Soria, and, after describing a wide sweep to the east, flows westwards across the northern half of the Spanish tableland and across Portugal. For a distance of nearly 60 miles it forms the boundary between the two countries. It begins to be navigable 80 miles above its mouth, but sea-going vessels ascend only to Oporto, and even so far, on account of a bar at the mouth, only at high tide. The principal tributaries on the right are the Pisuerga and Esla, on the left the Adaja, Tormes, and Coa (the last in Portugal).

The Guadiana (*i.e*., *Wádi Ana,* the *Anas* of the ancients) was long believed to take its rise in the district known as the Campo de Montiel, where a string of small lakes known as the Lagunas de Ruidera (partly in Ciudad Real, partly in Albacete) are connected by a stream which, on leaving the last of them, flows north-westwards towards the Zancara and then disappears within two or three miles of that river. About 22 miles to the south-west of the point of disappearance the stream was believed to re-emerge in the form of several large springs which form a number of lakes at no great distance from the Zancara, and these lakes are hence known as the “eyes of the Guadiana” (*los ojos de Guadiana).* The small stream issuing from them is known as the Guadiana and soon joins the Zancara. It has now been ascertained, however, that the stream

which disappears higher up can have no such course, but that in fact its waters flow or trickle underground to the Zancara itself, which is therefore entitled to be regarded as the upper Guadiana. It has its source not far from that of the Jucar in the east of the plateau of La Mancha, and flows westwards till, under the name of the Guadiana, it turns south-south-west on the Portuguese frontier. In piercing the Sierra Morena it forms a series of foam­ing rapids, and it begins to be navigable only at Mertola, about 42 miles above its mouth.

The Guadalquivir (*i.e*., *Wádi-el-Kebir,* “the great river,” the *Bætis* of the ancients), though the shortest of the great rivers of the Peninsula, is the only one that at all seasons of the year is a full- bodied stream, being fed in winter by the rains, in summer by the melting of the snows on the Sierra Nevada. What is regarded as the main stream rises in the Sierra de Cazorla in the east of the province of Jaen, but it does not become a considerable river till after it is joined by the Guadiana Menor (from the Sierra Nevada), on the left bank and the Guadalimar on the right. Lower down the principal tributary which it receives is the Jenil (left). In the days of the Moors the Guadalquivir was navigable for large vessels to Cordova, but, having been allowed to become silted up in the lower part of its course, it has only recently again been made navigable for vessels of 1200 tons burden to Seville.

The only considerable lakes in Spain are three coast lagoons,—that of Albufera in the province of Valencia, the Mar Menor in Murcia, and the Laguna de la Janda in Cadiz behind Cape Trafalgar. Small alpine and other lakes are numerous, and small salt lakes are to be found in every steppe region.

The geological structure of the Spanish Peninsula is comparatively simple. Upon a fundamental platform of ancient crystalline rocks, which had previously been upraised into detached ridges, a series of sedimentary formations was laid down, among which occur representa­tives of most of the geological systems from the older Palæozoic rocks up to those of Quaternary date. Arranged in order of age, with their respective areas, these various groups of rock are shown in the subjoined table :—

|  |  |  |
| --- | --- | --- |
| Quaternary  Pliocene | covering 49,477 sq. kilom., or 10·00 of whole surface | |
| „ 9,064 | ,, l∙80 |
| Miocene and oiigoccne. | „ 137,867 | „ 27∙85 ,, |
| Eocene | „ 23,564 | ,, 4∙80 ,, |
| Cretaceous | ,, 47,002 | ,, 9·50 ,, |
| Jurassic | ., 22,697 | ,, 4·45 ,, |
| Tπassic | ,, 22,343 | ,, 4·45 |
| Carboniferous | „ 11,301 | „ 2·22 |
| Devonian | ,, 5.780 | ,, l∙40 |
| Silurian (and Cambrian) | „ 114,382 | „ 23∙18 |
| Archæan | ,, 49,665 | „ 0∙35 |
| Eruptive rocks of various ages | ,, 10·00 ,, |

Archæan rocks are exposed in the northern half of the Peninsula, particularly along the great Pyrenean axis, in Galicia, Estremadura, the Sierra Morena, the Sierra Nevada, and Serrania de Ronda. They consist of granites, gneisses, and mica-schists, with talc-schists, amphibolites, and crystalline limestones. The oldest Palæozoic strata are referred, from their included fossils, to the Cambrian and Silurian divisions. They range through a vast region of Andalusia, Estremadura, Castile, Salamanca, Leon, and Asturias, and along the flanks of the Pyrenean and Cantabrian chain. They consist of slates, greywackes, quartzites, and diabases. Grits, quartzites, and shales referable to the Devonian system occur in a few scattered areas, the largest and most fossiliferous of these occurring in the Asturias. The Carboniferous rocks of Spain are divisible into three groups, the lowest consisting of limestones with sandstones and shales, the middle of conglomerates and sandstones, and the upper of sandstones, conglomerates, shales, and coals. They lie in detached basins, and have not yet been well explored. One of these areas covers a considerable space in the Asturias, whence it stretches more or less continuously through the provinces of Leon, Palencia, and Santander, covering altogether an area of 6500 square kilometres. Another tract occurs at San Juan de las Abadesas in Catalonia, where it occupies about 200 square kilometres ; while a third, about 500 square kilometres in extent, runs from the province of Cordova into that of Badajoz. There are other smaller areas containing little or no coal, but showing by the included plant-remains that the strata undoubtedly belong to the Carboniferous system.

The Triassic system is well developed in the north of the Peninsula along the Cantabrian chain and eastwards to the Mediterranean. It is composed of red and variegated sandstones, dolomites, and marls, traversed in some places by ophitic rocks, and containing deposits of gypsum, aragonite, and rock-salt. These strata are overlain by members of the Jurassic series, which are especially conspicuous in the eastern part of the Peninsula