have all suffered particularly in this manner, later occupiers never having been able to rival the Moors in overcoming the sterility of nature, as in Aragon, or in taking advantage of its fertility, as in Andalusia and the Tierra de Barros. The implements in general use are of the rudest description. The plough is merely a pointed stick shod with iron, crossed by another stick which serves as a share, scratching the ground to the depth of a few inches. But the regular import now of agricultural implements (chiefly from Eng­land and France) betokens an improvement in this respect. In general there has been considerable improvement in the condition of agriculture since the introduction of railways, and in every province there is a royal commissioner entrusted with the duty of supervising and encouraging this branch of industry. Among other institutions for the promotion of agriculture the royal central school at Aranjuez, to which is attached a model farm, is of special importance.

The provinces in which agriculture is most advanced are those of Valencia and Catalonia, in both of which the river valleys are thickly seamed with irrigation canals and the hill-slopes carefully terraced for cultivation. In neither province is the soil naturally fertile, and nothing but the untiring industry of the inhabitants, favoured in the one case by the rivers which traverse the province from the tableland of New Castile and the numerous small streams *(nacimientos)* that issue from the base of the limestone mountains of which the province is largely composed, and in the other case by the numerous torrents from the Pyrenees, has converted them into two of the most productive regions in Spain. In the Basque Provinces and in Galicia the cultivable area is quite as fully utilized, but in these the difficulties that have to be contended with are not so great. The least productive tracts, apart from Aragon and Estremadura, are situated in the south and east of New Castile, in Murcia, and in Lower Andalusia—the marshes or *marismas* of the lower Guadalquivir and the *arenas gardas* between that river and the Rio Tinto. By far the greater part of the tableland, however, is anything but fertile, the principal exceptions being the Tierra de Campos, said to be the chief corn-growing district in Spain, occupying the greater part of Palencia in the north-west of Old Castile, and the Tierra de Barros, in the portion of Badajoz lying to the south of the Guadiana in Estremadura, another district noted for its corn.

Except in Leon and the provinces bordering on the Bay of Biscay and the Atlantic irrigation is almost everywhere necessary for cultivation, at least in the case of certain crops. Almost all kinds of vegetables and garden-fruits, oranges, rice, hemp, and other products are generally grown solely or mainly on irrigated land, whereas most kinds of grain, vines, and olives are cultivated chiefly on dry soil. The water used for irrigation is sometimes derived from springs and rivers in mountain valleys, whence it is conveyed by long canals *(acequias)* along the mountain sides and sometimes by lofty aqueducts to the fields on which it is to be used. Sometimes the water of entire rivers or vast artificial reservoirs *(pánlanos)* is used in feeding a dense network of canals distributed over plains many square miles in extent. Such plains in Valencia and Murcia are known by the Spanish name of *huertas* (gardens), in Andalusia by the Arabic name of *vegas,* which has the same meaning. Many of the old irrigation works,—such, for example, as those of the plain of Tarragona,—date from the time of the Romans, and many others from the Moorish period, while new ones are still being laid out at the present day. Where no running water is available for irrigation, water is often obtained from wells by means of waterwheels *(glorias)* of simple construction. In most cases such wheels merely have earthenware pitchers attached to their circumference by means of wisps of esparto, and are turned by a horse harnessed to a long arm fitted to a revolving shaft. In recent years many artesian wells have been sunk for irrigation. According to Higgin (see Bibliography), the total area of irrigated land in Spain amounts to 4439 square miles. The effect of irrigation is shown by the fact that the irrigated portion of Murcia has a population of 1681 to the square mile as against 101 for the whole province, and Orihuela a population of 767 to the square mile as against 194 for the whole province of Alicante to which it belongs.

Cereals constitute the principal object of cultivation, and among these wheat ranks first, the next in importance being barley, the chief fodder of horses and mules. Both of these grains are cultivated in all parts—on the plains as well as among the mountains, but chiefly on the more level parts of the two Castiles and Leon, and on the plains of the basin of the Guadalquivir. Oats and rye are cultivated only in the higher parts of the mountains, the former as a substitute for barley in feeding horses and mules, the latter as a breadstuff. Maize also is cultivated in all the provinces ; nevertheless the total extent of its cultivation is limited, since, being a summer crop, it requires irrigation except in the Atlantic provinces, and other products generally yield a more profitable return where irrigation is pursued. Rice is cultivated on a large scale only in Valencia. Among cereals of less importance are buckwheat (in the mountainous regions of the

north), millets, including both the common millet *(Panicum miliaceum)* and the so-called Indian millet *(Sorghum vulgare,* the *joári* of India, the *durrah* of Africa), and even (in La Mancha) guinea-corn *(Penicillaria spicata).* As to the quantity of cereals produced in the country we are without official informa­tion, and the estimates of the average annual production of cereals of all kinds are very discrepant, varying from 250 to 430 million bushels. The average production of wheat alone has been esti­mated@@1 at 177 million bushels, and the average produce of that crop per acre at 11·13 bushels (that of England being about 29 bushels). If these figures can be taken as approximately correct, it follows that the average acreage under wheat in Spain is nearly 16 million acres, or between five and six times the average in Great Britain, which has less than half the area of Spain. The produce per acre just indicated places Spain among those countries of Europe in which the return is least, which is probably fully accounted for by the backward state of cultivation generally and in particular by the small expenditure on manure. As a rule, in fact, the straw left on the ground is the only manure which the land receives.

The cereal and especially the wheat production of the country regularly furnishes a considerable export. During the five years 1879-83 the value of the export of cereals and pod-fruits of all kinds was nearly 3 per cent. of the total value of the exports ; but this export is balanced by a large import, especially of wheat flour. In bad years, indeed, the value of the import under this head greatly exceeds that of the export.

In the production of pod-fruits and kitchen vegetables Spain is ahead of all other countries in Europe. The chick pea forms part of the daily food of all classes of the inhabitants ; and among other pod-fruits largely cultivated are various kinds of beans and pease, lentils *(Ervum lens),* Spanish lentils *(Lathyrus sativus)* and other species of *Lathyrus,* lupines, &c. The principal fodder-crops are lucerne *(Medicago saliva)* and esparcette (a variety of sainfoin). Clover, particularly crimson clover (*Trifolium incarnatum),* is grown in the northern provinces. Among vegetables garlic and onions take the chief place, and form an indispensable part of the diet of all Spaniards ; besides these, tomatoes and Spanish pepper are the principal garden crops. It is upon such crops that the Spanish peasant in general bestows his chief care.

As regards the quantity of the product wine comes next after cereals among the objects of cultivation in Spain. Here again we are dependent only upon vague estimates of the average amount produced, but usually the average annual Spanish production of wine is estimated at between 440 and 500 million gallons, an estimate which places Spain third (next after France and Italy) among the wine-producing countries of Europe. So far as quantity is concerned the principal wine-producing districts are in the north­east, but the only wines of Spain which have a world-wide reputation are those of the south, and more particularly those which take the name of “sherry,” from the town of Jerez, in the neighbourhood of which they are grown. The total area under the vine is estimated at about 3,480,000 acres (or about 2·8 per cent. of the entire surface), and of this total about 772,700 acres belong to the Catalonian provinces, chiefly Barcelona. The provinces which produce most wine are Barcelona, Saragossa, Cadiz, and Malaga, the annual amount of the production being in the order in which the provinces are mentioned.

The official tables distinguish the wines exported from Spain as common wines, sherry aud similar wines, and other full-bodied wines *(vino generoso).* The returns of recent years, as will be seen from Table III. given below, show that of late an enormous increase has taken place in this export both as regards quantity and value, this increase being chiefly due to the extension of the export of the commoner wines to France by way of Barcelona.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Average of Five Years 1874-78. | | Average of Five Years 1879-83. | | 1884. | |
| Thousands of Gallons exported. | Value in thousands of Pounds. | Thousands of Gallons exported. | Value in thousands of Pounds. | Thousands of Gallons exported. | Value in thousands of Pounds. |
| Common wine | 40,524 | 2,547 | 133,562 | 7,748 | 135,432 | 8,865 |
| Sherry and similar | 6,446 | 2,466 | 5,874 | 2,137 | 5,368 | 1,465 |
| wines |  |  |  |
| other full - bodied wines | 2,244 | 470 | 3,388 | 879 | 2,420 | 493 |
| Total | 49,214 | 5,483 | 142,824 | 10,764 | 143,220 | 10,823 |

There is also a large export of grapes and raisins, especially from the southern provinces (Malaga and Almeria). The average quantity of the two together exported in each of the five years

@@@1 In an article by M. P. A. Delboy in the Journal of the Statistical Society for March 1S84, translated from the Journal de la Société de Statistique de Paris, September 1883.