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On the innermost margin of these fixed dunes *Ulex europæus* is occasionally met with. Mosses and lichens are common here, and in the transitional associations. They play an important part in preparing the ground for the growth of flowering plants. Here and there on these fixed dunes limited areas have been enclosed and are now under cultivation. It is impossible at this preliminary stage in the study of the vegetation of this formation to form any opinions on its composition and distribution which will be of lasting value. The particular area which forms the subject of this communication is too restricted in extent, in any case, for generalised deductions. The mere listing of species included in the different associations is but the initial stage in any ecological study. Were these lists complete, much would yet remain to be done. Critical forms must be made the subjects of careful investigation. A thorough investigation of the dependent species and their habit of life must be undertaken, to determine the relationship existing between them and the dominant type, in the association in which they occur.

The powers of adaptation and adjustment to environment of the individual plants, and many other kindred problems, still await solution.

NOTE ON *ARGANIA SIDEROXYLON*, ROEM. ET SCHULT., THE
ARGAN TREE OF MOROCCO. By SYMINGTON GRIEVE.

Morocco, although so near to our shores, is less explored than almost any part of the world. Large areas of the country, especially along the line of the Great Atlas range, with stretches upon each side of these mountains, are quite unknown. It is from these mountain fortresses that have come those hordes of wild men who know no other law than that "might is right."

To judge from the merchandise brought to the coast towns, the country seems to be productive. Under good and firm administration its resources may perhaps be developed in a way that will surprise Europe. The impression formed from what we saw at Casa Blanca and elsewhere was that the French had come to stay. Recent events have shown that we were not wrong in our anti-

cipations. No nation builds cantonments for its soldiers, and erects great walled caravanseries outside the gates of the coast cities to protect the merchants, their merchandise, camels, mules, and donkeys, from brigands, unless it anticipates being able to occupy the country permanently.

It is in Southern Morocco that the only forest of *Argania Sideroxylon* is known. It grows upon the arid plains and lower spurs of the foothills of the great Atlas range, stretching from the river Tansift on the north, southwards past the walled city of Mogodor, to near Agadir, where the Germans recently anchored their warships. The Argan forests are confined to the two provinces of Haha and Shiadhma. The forest is quite natural and not cultivated in any way, and you may ride for miles and miles among these trees. At a short distance the traveller might think he was approaching a forest of olive trees, but a little nearer the illusion is dispelled, as the leaf is different and the fruit larger. The trees are wide-spreading, thorny, and most grow to a height of from 15 to 25 feet. One of these trees is mentioned in Hooker's *Journal of Botany* for 1854 (vol. vi. p. 97), which measured not more than 18 feet in height, while its outer branches spread so as to give a circumference of 220 feet. Some are apparently of great age, with gnarled stems and branches, into which goats climb, as they, as well as camels, cows, and sheep, are very fond of the fleshy pericarp. It forms for these animals a valuable food, but is of no value otherwise. The ripe fruits contain a stone which, when broken, is seen to contain a kernel, and these kernels are of great commercial value.

Budgett Meakin, *Land of the Moors*, p. 42, says:—

“The nuts having been cracked between stones by the natives, the kernels are roasted, pounded, and kneaded by hand, first with the addition of a little hot water, then with cold. The oil is then expressed, and the residuary cake is given to cows and goats, as horses and camels refuse it. Argan oil is really good, but suffers like that of the olive from the primitive process employed. It is necessary to clarify it and to burn off impurities before use, unless one is hardened to its acrid taste and pungent smoke. This is accomplished by boiling the oil with a sliced onion and, when hot, dropping in a piece of crumb

bread which is allowed to char and is then thrown away. Both oils are used for burning in native lamps."

From the size of the trees it may be gleaned that they do not yield any really large timber, but some of the trees have short, thick stems; the wood is hard, fine-grained, and yellow in colour.

The Moors very much prefer Argan oil to Olive oil for culinary purposes. They have, however, a strange belief that in some way its use predisposes to leprosy. Leo Africanus, who wrote about 1526, mentions this. As a specific for leprosy it is recommended to use a decoction of Argan leaves, both internally and externally.

G. G. Colaço, Portuguese Consul at Laraiche in 1818, was convinced that copious draughts of this oil were a cure for the bubonic plague. This plague, known as the "black death," had raged in Morocco just prior to that time, and he was so sure of the efficacy of the treatment that he had circulars printed in Arabic to enlighten the people and persuade them to use the remedy.

It is said that attempts have been made to grow this tree in different countries with climates that seemed suitable. Some of these trials were at first attended with prospects of success, but ere long turned out entire failures.

I obtained some of the fruits when in Morocco, and an attempt is now being made to grow trees from some of them at the Royal Botanic Garden.¹ The fruit is, when ripe or approaching ripeness, pale yellow, but, as it ripens further, becomes darker in colour, and old fruits are nearly black.

The principal outlet for the trade of the Sahara, Tafilat, Marakesh, or Morocco city, the southern portion of the Great Atlas range, and the district of the Sus, is by the trade routes converging upon the city of Mogodor. The present city, with its imposing walls and gateways, was built in 1760 by Sidi Mohammed XVII. This town is well laid out from the plans of a French engineer named Cornuc. There is a good water supply, which is conveyed by an overground closed conduit from a fine spring near Diabát to a large stone tank beneath the sand hills. Even in recent times this city has had exciting experiences. On

¹ Young plants grown from the above fruits are now (May 1913) about 15 to 18 inches high, and are all in a healthy condition.

13th August 1844 it was bombarded by the French under the Prince de Joinville. After the bombardment the neighbouring tribes sacked the city, massacring the inhabitants. A short time after, when the war with the French was ended, a messenger was sent by the Sultan to tell the inhabitants of the conclusion of peace. When he arrived there was not a soul left in Mogodor to whom he could deliver the message. In 1873 the tribesmen besieged the city closely, cut off the water supply, and destroyed the gardens. These proceedings had a most serious effect upon the besiegers, who could not storm the walls as they had no cannon, could not continue the siege without food, and so they had to retire.

It is to Mogodor that almost all the Argan oil comes that is sold, but I understand that at present there is such a good home demand that very little leaves the country.

THE SCOTTISH ALPINE BOTANICAL CLUB EXCURSION, 1911.

By ALEXANDER COWAN.

Owing to the visit to Edinburgh of His Majesty the King and the postponement of the Highland Show to the last week of July, it was decided to meet this year at Barnstaple, in Devonshire, in the first week of August, as several members of the Club had made arrangements to attend the annual meeting of the British Pteridological Society held there at the same date.

Although several members had expressed their intention of joining the excursion, most of them were prevented at the last moment from going, and the party which left Edinburgh on Tuesday, 1st August, consisted of only the President, the Chaplain, and the Secretary. As a night had to be spent somewhere on the way to Barnstaple, it was decided to stay at Bristol in order that a visit might be paid the following morning to the Clifton Zoological Gardens, where the members were most kindly shown round by Mr. Harris, the curator. Here a large quantity of very fine specimen trees are to be seen, as well as a collection of over a hundred varieties of Holly, and the late Colonel Jones' extensive collection of British Ferns, in which the varieties of *Polystichum angulare* and