they reaped a good harvest at the confessional." Further particulars are supplied in an extract from Mr. Mackenzie's Meteorological Diary sent to me, in which it is observed: "The remarkable and extraordinary cold and wet weather in June, 1857, has no parallel in the records of any former period. The quantity of rain which fell was more than the total amount during the same month for the last 12 years! A violent and destructive thunderstorm occurred on the morning of the 12th, which continued for two hours. The hailstones, or rather pieces of ice, were of an incredible size, angular in shape, with sharp edges, and destroyed every tender plant within their range. Several Vineyards more exposed than others were literally stripped bare of their foliage and fruit. Fortunately this terrific storm was local, its ravages being confined to one district. Those sceptics who doubt the truth, as recorded in the book of Joshua, chap. x., should have witnessed this storm. The more credulous of the natives had been for some time in a state of great excitement and alarm, in consequence of a prevailing rumour that a comet, commissioned to overwhelm the earth, was to appear on the 13th June. When, about 10 o'clock on the morning of the 12th, the southern sky became dark, lowering, and threatening, the more timid became terrified, and their consternation reached its meridian when the first loud peal of thunder burst over the city. Peal after peal, louder and louder, followed in rapid succession, while rain mingled with hail fell in torrents, accompanied by vivid flashes of forked lightning darting in every direction in brilliant sinuous streams amidst the contending elements. The scene was, in truth, awfully grand and impressive, and no doubt existed in the minds of the terrified people that the unwelcome visitor had actually arrived, bearing in its train the advent to the consummation of all things. Panic gave place to despair, and the desponding portion of the community rushed *en masse* to their churches. The covenant made with Noah and his posterity, on the appearance of the first rainbow, seems to have been unknown or disregarded by those formal worshippers."

To these details may be added a notice of the usual state of the weather, and of the customary rural operations in Corfu in the month of June: "The corn and hay harvest begins and ends with this month, and the gardener's labour commences. Everything in the vegetable line requires irrigation, and when the water has to be brought from a distance this work is tedious and laborious, and considerably reduces his profits. Tobacco and Beet are now transplanted. The sky is pure and serene, and the barometer seldom varies four-tenths. Although the heat is great, the sun remaining nearly 16 hours above the horizon, yet there is sufficient moisture in the ground to render this month pleasant and agreeable, and to good constitutions it is one of the healthiest months in the year." Mr. Mackenzie has made careful daily observations during the last 19 years. *George Lawson, Ph. D., Edinburgh, Oct.* 12.

ON THE NORTHERN LIMITS OF VINE CULTIVATION.

(From A. De Candolle's Géographie Botanique.)

Continued from p. 708.

Analogous facts regarding the retrogression of limits of Vine cultivation are presented in the north-west of Germany. Meyen states that in the 14th century the Vine was introduced into Prussia, and that it was cultivated there long since that epoch. M. J. G. Bujach has published in a Kœnigsberg journal an article on the ancient Vine culture in Prussia, when that country was under the Teutons. The wine made was acid, and now-a-days would be undrinkable compared with more southern wines. The climate of the shores of the Baltic, between Dantzig and Kœnigsberg, is not very unfavourable to the Vine, and we find that even now it is sometimes cultivated there. Lastly M. Streicher assures me that Grapes are not grown now near Cracow, though there are localities named after the Vineyards which once grew there.

To return to the present limits of the Vine, there are extensive Vineyards in Bohemia (notwithstanding the elevation of that country), in Moravia, and more still in Hungary. The chain of mountains called successively Riesengebirge and Carpathians define its limits in that part of Europe, and it does not extend beyond them, except eastwards under the 48th degree. Thence it passes to the province of Bukovina where there are Vineyards in favourable localities, but there are none in Galicia. At Kiew Grapes ripen badly and in gardens only, no wine being made. Descending the Dniester, the first Vines are met with at Mohilow under the 48th degree, on the Dnieper under the 49th degree, on the Bug under the 47th degree. On the banks of the Don the culture of the Vine is extensive from Axais to Tcherkask. On the Volga it is cultivated at Sarepta, lat. 48½°, and probably as far north as 50½°.

In southern Russia it is customary to bury the Vines during winter to protect them against the great cold, and the frosts of September sometimes destroy the crop.

In central Asia Vines are grown here and there in low populous valleys. Humboldt mentions their being found at Hamil (lat. 43°), and at Lhassa in 29° 41′. The height and extent of the mountain chains in the centre of that continent are an evident obstacle to this culture. Bunge informs me that Vines are grown in North China, in the environs of Pekin, and in great abundance, even as far north as Gouan-gou, beyond which he saw no Vineyards; but the plants were everywhere covered with manure during the winter, the cold often descending to 5° Fahr.

In North America, at least in the United States, the *Vitis vinifera* has wholly failed. It was first attempted by Swiss on the banks of the Ohio, lat. 39°, but the wine was sour, did not keep, and did not pay its expenses, and the Vineyards have since given place to corn fields. Fine but limited crops of Grapes are said to have been obtained near Cincinnati, but other attempts have failed; of these the most remarkable is that of Lakanal, who resorted to various expedients in several of the States, changing the localities, plants, &c. Again, a Mr. Longworth, of Ohio, pursued his attempts for 30 years with remarkable zeal but no success, and it has been found necessary to use the Catawba Grape, an original wild Grape of America, of which 1500 acres are cultivated in Ohio, 300 to 400 in Cincinnati, and about 1000 in Missouri, Indiana, and Ohio. These Vineyards are increasing and profitable.

In New Mexico and California the climate is more favourable, and the European Vine is cultivated, but it has not been introduced into the more recent settlements, and it is impossible to say what its future limits may be in Oregon.

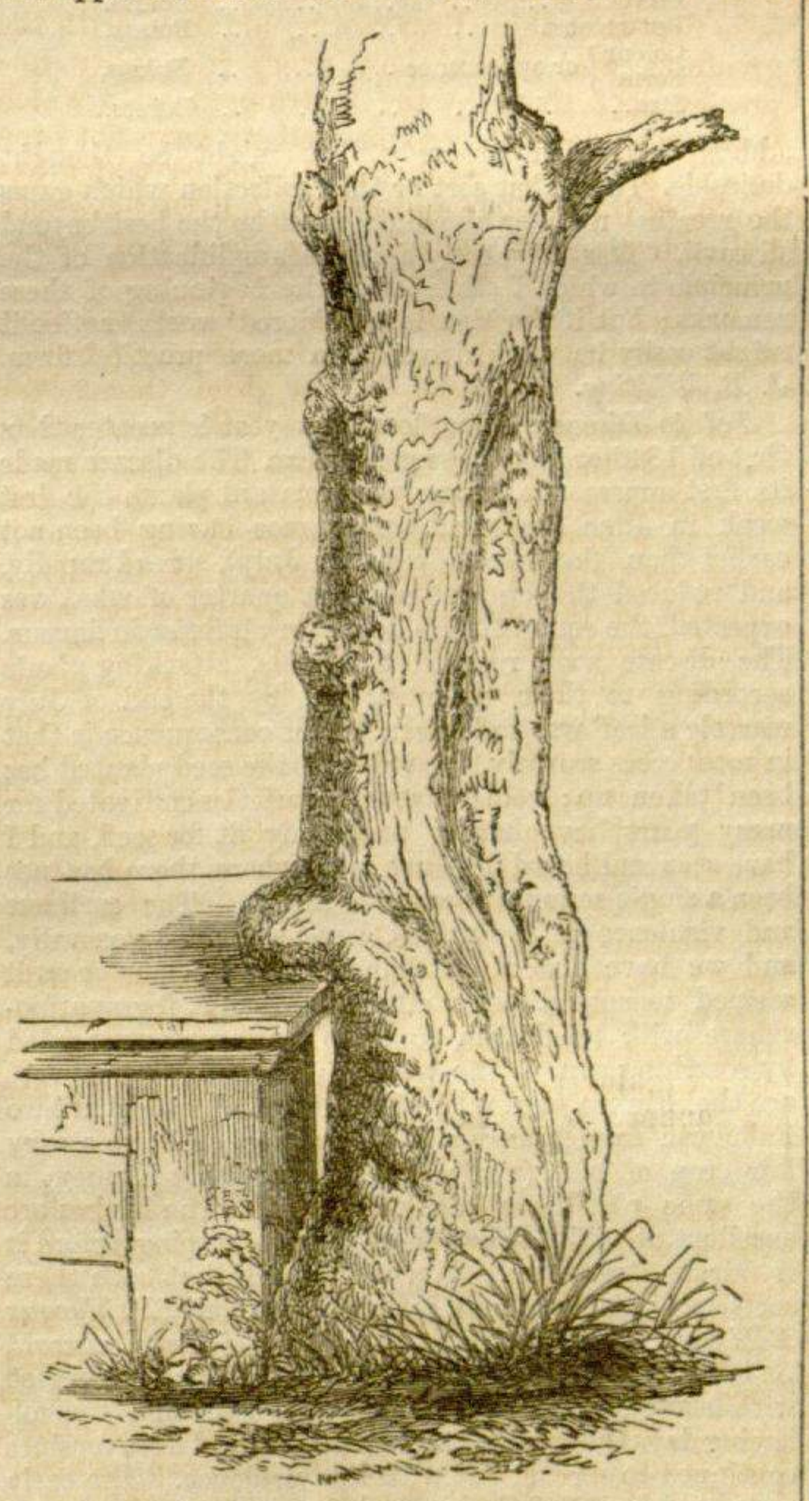
In the southern hemisphere the Vine thrives in Chili, and excellent wine is made to the east of the chain of the Andes at Mendoza, Saint Juan, and La Rioja, but its southern limit is not known. Schouw mentions the Vine at Conception under the 37th degree.

Wine of the best quality is sometimes produced at the Cape of Good Hope; that of New South Wales resembles the wines of the banks of the Loire; and in general the dry climate and light soils of Australia are well adapted to Vine cultivation. That of Tasmania is too humid.

[In the above excellent *resumé* the extensive Vine cultivation of the North Western Himalayas, Affghanistan, and Persia is not mentioned. The reported cultivation at Lhassa is open to doubt; Huc and Gabet, the only Europeans who have visited Lhassa, make no allusion to it; and the testimony of recent Himalayan travellers who have questioned the Tibetans upon the subject seems to prove that the climate is much too rigorous and arid.]

Home Correspondence.

Wood formed by the descending Sap.—The accompanying drawing was made in the churchyard of Kirk Braddan, in the Isle of Man, a few days ago, and represents an Ash tree which, growing in contact with a tombstone, accidentally affords a good example of the deposition of wood by the descending sap. The fluid ascending through the central portion of the tree has met with no opposition to its course, but, during the last few years of the growth of the Ash, the latter has come into contact with the edge of the tomb-stone, and the flow of the descending current has been impeded, so that wood has been deposited in a rounded mass upon the upper surface of the flat slab. The dates inscribed



upon the stone are respectively—January 7, 1808; November 21, 1811; January 3, 1836; from which it is evident that when the last tenant was added to the tomb the tree could not have begun to encroach upon its surface; and had it done so to any extent, growing as it does within the iron railing of the place of interment, the plant would probably at that time have been cut down or mutilated. *John Topham, Wolverhampton, Sept.* 23.

Bees and Fertilisation of Kidney Beans.—Mr. Swayne in the 5th volume of the Horticultural Transactions incidentally speaks of the advantage of artificially fertilising the early Bean. Can you tell me to what sort of Bean he refers? [We presume to the Early Mazagan; but we have no special information.] and who has followed this plan, and how has it been effected? My motive for asking is as follows: every one who has looked at the flower of the Kidney Bean must have noticed in how curious a manner the pistil with its tubular keel-pistil curls like a French horn to the left side—the flower being viewed in front. Bees, owing to the greater ease with which they can reach the copious nectar from the left side, invariably stand on the left wing-petal; their weight and the effort of sucking depresses this petal, which, for its attachment to the keel-petal, causes the pistil to protrude. On the pistil beneath the stigma there is a brush of fine hairs, which when the pistil is moved backwards and forwards, sweeps the pollen already shed out of the tubular and curled keel-petal, and gradually pushes it on to the stigma. I have repeatedly tried this by gently moving the wing petals of a lately expanded flower. Hence the movement of the pistil indirectly caused by the bees would appear to aid in the fertilisation of the flower by its own pollen; but besides this, pollen from the other flowers of the Kidney Bean sometimes adheres to the right side of the head and body of the bees, and this can scarcely fail occasionally to be left on the humid stigma, quite close to which, on the left side, the bees invariably insert their proboscis. Believing that the brush on the pistil, its backward and forward curling movement, its protrusion on the left side, and the constant alighting of the bees on the same side, were not accidental coincidences, but were connected with, perhaps necessary to, the fertilisation of the flower, I examined the flowers just before their expansion. The pollen is then already shed; but from its position just beneath the stigma, and from its coherence, I doubt whether it could get on the stigma, without some movement of the wing petals; and I further doubt whether any movement, which the wind might cause, would suffice. I may add that all which I have here described occurs in a lesser degree with Lathyrus grandiflorus. To test the agency of the bees, I put on three occasions a few flowers within bottles and under gauze: half of these I left quite undisturbed; of the other half I daily moved the left wing-petal, exactly as a bee would have done whilst sucking. Not one of the undisturbed flowers set a pod, whereas the greater number (but not all) of those which I moved, and which were treated in no other respect differently, set fine pods with good seeds. I am aware that this little experiment ought to have been repeated many times; and I may be greatly mistaken, but my belief at present is, that if every bee in Britain were destroyed, we should not again see a pod on our Kidney Beans. These facts make me curious to know the meaning of Mr. Swayne's allusion to the good arising from the artificial fertilisation of early Beans. I am also astonished that the varieties of the Kidney Bean can be raised true when grown near each other. I should have expected that they would have been crossed by the bees bringing pollen from other varieties; and I should be infinitely obliged for any information on this head from any of your correspondents. As I have mentioned bees, a little fact which surprised me may be worth giving:—One day I saw for the first time several large humble-bees visiting my rows of the tall scarlet Kidney Bean; they were not sucking at the mouth of the flower, but cutting holes through the calyx, and thus extracting the nectar. I watched this with some attention, for though it is a common thing in many kinds of flowers to see humble-bees sucking through a hole already made, I have not very often seen them in the act of cutting. As these humble-bees had to cut a hole in almost every flower, it was clear that this was the first day on which they had visited my Kidney Beans. I had previously watched every day for some weeks, and often several times daily, the hive-bees, and had seen them always sucking at the mouth of the flower. And here comes the curious point: the very next day after the humble-bees had cut the holes, every single hive bee, without exception, instead of alighting on the left wing-petal, flew straight to the calyx and sucked through the cut hole; and so they continued to do for many following days. Now how did the hive-bees find out that the holes had been made? Instinct seems to be here out of the question, as the Kidney Bean is an exotic. The holes could scarcely be seen from any point, and not at all from the mouth of the flower, where the hive-bees hitherto had invariably alighted. I doubt whether they were guided by a stronger odour of the nectar escaping through the cut holes; for I have found in the case of the little blue Lobelia, which is a prime favourite of the hive-bee, that cutting off the lower striped petals deceived them; they seem to think the mutilated flowers are withered, and they pass them over unnoticed. Hence I am strongly inclined to believe that the hive-bees saw the humble-bees at work, and well understanding what they were at, rationally took immediate advantage of the shorter path thus made to the nectar. *C. Darwin, Down, Bromley, Kent, Oct.* 18.

Honfleur Melon.—I have now a fruit of this Melon weighing 18 lbs. 10 oz., which has been grown entirely in the open ground as you would Cucumbers; this has