

means why seedling plants should not produce flowers of different colour from the opposite side of the stem, as well as in connection with the origin of the foliage. Not only does it frequently occur that seedlings have been produced from the one side of the stem, but the seedling plants which produced genuine variegation from the one side and never produced foliage on the other. It would be well to watch and note whether this tendency of the Palæogonon to appear as regards the colour of its flowers at the present time is occurring generally. It seems also to be spreading rapidly, and on the Continent its distribution also. At the time Mr. Greene made his few treasured foliages within the Palæogonon showed symptoms of sprouting (especially in dependence of those best from the virginian parent) into variegation both in England and on the Continent at the same time. These facts, as regards the changes resulting in plants, or trees, are worthy of record, because it is just possible they may throw some light upon the formation, not merely of new varieties, but of what are termed species, both in the vegetable and animal kingdoms, for I think it probable that such of these species, if they were not intergraded by single flowers, and propagated from seed, but were left to themselves (if an amusing new to the sports into finished a given number of years, would often be found with the single varieties from which they sprang, and would therefore be termed new species. The watching the course and noting these physiological facts as they occur, unimportant as they appear at first sight, might lead to the solving of some of the unsolved problems of life as to the origin of all species. JOHN DAVIS.

The Weather at Jenevery Castle, 1895.—Although the month here for the year 1895 was much less than usual, it will be considered light in comparison with most months of October, even with the season that here has been subject to, but notwithstanding the usual drenching which occurs, the distribution of rain in the locality was such that during the summer months vegetation of all kinds continued growing unimpeded to the close of its growth, and where prevalent abnormally during the summer months, with north wind occasionally increasing. Frost in the kitchen garden, which in our ordinary seasons is common, began on the 2nd inst. as far as I am aware, for the first time, for example, French Beans, Vegetable Marrows, Peas, and Carrots. Frosts on the walls were also abnormal, and good in quality of Peas I may mention. For example, Cannons, Longwells, Autumn Emperor, Beauty of Nancy, Scotch Peas, German, Water Nibs, Hoar, Uxbridge & Co., Latham, Peas only in the bedding pot, Peas, Globe, Williams, Wigan, Lion, Uxbridge, & Co., Egg (the latest and earliest here), Brown Beauty, but in the open quarters in the kitchen garden Peas do not come to maturity, and even on the walls the branches must be kept close against, and the open wall flanked out low. Peas on the walls, such as Coar's Uxbridge Drop, Kirby's Jefferson, Hagston Bonnet, Royale Hibernia, and Orleans, the Victoria class very well in the open quarters, but many of the other early Peas are liable to have their weather. Such as Royal as the Red Nones, Kentucky Cobbin, Tower of Glass, & Co., and others, succeed well here in good seasons. The intervals of warm, dry weather between the showers was at the least favourable for the flower growth, and imparted a luscious to the fruit of which I have not seen since I came here.

Record of Jenevery Castle in 1895.

Days	Wet	Wet	Wet
January	1	1	2
February	1	1	1
March	1	1	1
April	1	1	1
May	1	1	1
June	1	1	1
July	1	1	1
August	1	1	1
September	1	1	1
October	1	1	1
November	1	1	1
December	1	1	1

JOHN COLE, Jenevery Castle.

BUNCHES V. TENDRILS.

THE remarks which follow are designed to show the possibility of the contemporary of *Vitis tendrils* into fruit-bearing branches by mechanical means, and the effect of weight in preventing the fruiting branches of the Grape Vine from degenerating into mere tendrils.

There are points that seem to have escaped the attention of Mr. Darwin in his charming and instructive work on climbing plants. I stand, with your permission, perhaps my remarks with extracts from this work on the natural side of *Vitis*. These will prove most instructive in themselves, and show much light upon the additional form which I intend to adduce in relation to the possible modification of structure and formation by mere weight or pressure. On p. 123 of Mr. Darwin's work we find the *Vitis tendril* of the seed type, a figure of which is appended (3).

The author describes the tendril (with his woodcut) thus:—"It is thick and of great length; one from a Vine growing out-of-doors, and that rigidly, only, is 15 inches long. It consists of a peduncle (a) and a lamina (b) which diverges at its base."

One of the branches (a) has a small leaf-like base. It is always, as far as I have seen, longer than the other, and often bifurcate." This is but one example of thousands of the cure and penetrating observation of the author. I venture to affirm that there are hundreds of Grape growers who never notice any such, and I sincerely wish to believe that it was a signal of discovery that the first branch (a) of the tendril had the leaf may be taken by our rising gardeners that nothing is too small to be noted; most that it is in the region of the smallest structure or other differences that great principles are seen in course of evolution and important truths discovered."

The lamina when rolled becomes curved, and subsequently a single formative. After (a) has changed into a single formative rigidly, but I hope not never where no object has been tried. The tendril now spontaneously from side to side, and on a very hot day, it may take two elliptical revolutions at an average rate of a hour's time. During these movements a coloured line painted along the convex surface appeared after a time on one side, then on the other side, and, lastly, again on the first side. The two branches of the same tendril now sub-parallel movements. After a tendril has spontaneously revolved for a time it bends from the light towards the dark. Mr. Darwin says that in a Vine planted against a wall the tendril points toward it, and in a vineyard generally more or less to the north."

It will also be necessary to give the author's description of a flower-stalk and tendril from p. 120, showing that the tendril of the *Vitis* are sub-petiole branches. The woodcut, Fig. 2, is a representation of a bunch of Grapes with spike, an accompanying tendril. "It consists of the common peduncle a, and of the lower tendril b, which is represented as having caught a twig, and of the sub-petiole c leaving the flower-buds. The whole consists of a single formative, but in a less degree; the movement, however, is generally in one direction. The sub-petiole c does not bear many flower-buds. The common peduncle a has not the power of clasping a support, nor has the corresponding part of a true tendril. The flower tendril b is always larger than the sub-petiole c, and has a scale at its base; it is sometimes bifurcate, and therefore corresponds in every detail with the large scale-bearing branch 1, of the true tendril. It is, however, inclined backward to the sub-petiole c, or stands at right angles with it, and is thus prepared to act in carrying the future bunch of Grapes. The lower and naked part of the sub-petiole c is highly sensitive to a wet, and I have seen it lead round a stick and even partly around a leaf with which it had come in contact." I have often met with cases of this sort, of which I reproduce in Fig. 3. *Vitis* in certain conditions and localities frequently show this tendency of the flower-branches to run into tendrils, a tendency that is confirmed if the sub-petiole c is allowed to remain round as in Fig. 5. Mr. Darwin continues:—"That a sub-petiole has the same nature as the corresponding leaf of a true tendril is well shown where it bears only a few flowers. In this case it becomes less branched, increases in length, and grows both in sensitiveness and in the power of spontaneous movement. I have twice seen sub-petioles which have from thirty to forty flower-buds, and which had become considerably elongated and were completely wood-stem like, exactly like true tendrils. The whole length of a true sub-petiole, bearing only three flower-buds, quickly becomes covered with a slightly ribbed, but even in this many number of ribs, I considered the stalk less sensitive than the other branch that is the flower-tendril, but the latter after a further 700 became curved more quickly and in a greater degree. I have seen a sub-petiole thickly covered with flower-buds with one of its higher leaves and the one branch had become nearly as long, and had spontaneously caught hold of an adjoining twig, in fact it formed a little sub-tendril."

The gradations, as the author plainly shows (p. 145), from the ordinary state of a flower-stalk, as represented in the woodcut Fig. 2, to that of a true tendril (Fig. 1), are complete. The common sub-petiole c sometimes partially assumes all the characteristics of a true tendril, and a true tendril sometimes carries on its extremities a single flower bud, which I have ventured to represent on the end of the common tendril (Fig. 1, a). Hence, there can be no doubt that the tendril of the *Vitis* is a modification of the peduncle of *Vitis* or of the branch of *Vitis* or of the branch of the convention of tendrils into fruiting branches, and on this hypothesis the huge masses recently shown at Edinburgh as single branches may be accepted as weighty arguments in favour of the transition, variation, or modification of structure, or the higher development of inferior parts or organs. It is well known that in the globe of the tendril, Robert Fish, was the first to discover the effects of pressure or weight as a modifying or transmuting force in this matter. Having the charge of a large vineyard at the Queen's Terrace, Hyde Park Corner, London, between thirty and forty years ago, he found that though he could command good shows of Grapes by means of the special atmosphere provided by a stack of fermenting manure within the house, hardly had the flower peduncles grown to anything like their full length when, probably in sympathy with *dicamba* and dissolved roots, they began to coil round any branch or twig they came in contact with, and to run into tendrils, as shown in Fig. 3. He soon found that when the twigs were removed the tendency to run into tendrils was the less than learned, and with a view to diminishing the dependent position, small weights were attached to the branches, as shown in Fig. 4. The result was as gratifying as it was at first unexpected. The unloading and the weight together soon checked the formation of tendrils, and forced the sub-petiole into its proper character of a bunch of Grapes. When I lined with my brother at Farnley Street, there was an old vineyard with the roots in a bad state, or very deep. The Grapes in it were always in danger of bolting of late more tendrils, unless weighted into fruit bearing, and we used to weight each with small pebbles as soon as they fairly showed. If any were missed, or if the vine or other weight slipped in its, these bunches ran off and were found to have become an instance of one sufficiently weighted to be like a true tendril. Since then, during more than twenty years' practice, I have weighted many suspicious-looking bunches, and always with the result of checking the degeneration of a fine bunch into a mere tendril. In this occasion a degeneration of parts there is often a great variety of structure. The flower-stalks, some after they are formed, often branch off into a number of hooked semi-tendrils, reaching, of course, into fruiting state on the other hand, true tendrils that show flowers on the extremities or other parts—like these flowers are by no means confined to the extremities—set and pull their fruit later if also weighted.

It is well to note that the weighting of the sub-petioles is not nearly so essential, unless the twigs (a, c, Fig. 5), is carefully undone. There can be no doubt that that single revolution functions to a large extent the character of the entire branch beyond, and sometimes in a powerful manner its individual tendencies; in fact, unless that circle is undone, it is comparatively useless to attempt to have back the runaway branch into fruitfulness. I have seen some such sub-petioles weighted above the twigs and daily snap off, and the remaining portions run off into tendrils, or even round, as in some previous, nothing something akin to a sympathy of parts, and the dominating fact, the means of weighting is enhanced by removing the twigs, as shown in Fig. 4. I have also noticed that the tendency of the sub-petiole to form a tendril is increased in proportion to the strength and length of the twigs, and would, therefore, strongly recommend the removal of all tendrils at the first possible moment.

Another point of great practical interest remains. The transition of the sub-petioles of the flower-stalks of the *Vitis* into tendrils in any considerable number is a sign that something is wrong with the roots. It is this curious example of the law of the compensation of loss. Vind loss, from some cause or other, is lowered, and is made to carry a heavy load, the consequent modification of parts seems to be related, and manifests the nearly and

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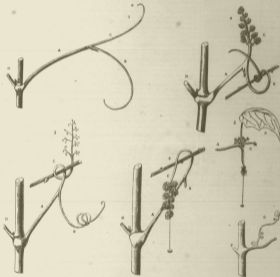
express of the health and strength of the Vine; for there can be no doubt that the weighing, in so far as it is essential to the attainment of the degeneration of the feeding branches into tendrils, favors the initiation of Nature, which was to carry through that season little or no fruit.

The effect of weight in promoting fruitfulness is further seen in the fact, that as soon as any fruit sets and begins to swell on the sub-peduncle, the formation of tendrils ceases. The natural weight of the berries brings back the wayward branch, as it were, to its proper position—that of fruit bearing. So strong is this check that I have seen tendrils on the fruit bearing branch attempt to form flowers after the

of its second attempt the same season? I know this interesting fact may be explained by other causes, but it is not probable that the weight of the first crop is a factor of some weight in the production of the second? It seems pretty certain at least that fertility reproduces itself, unless absolute exhaustion puts an end to its continuity, the more weight of the produce may be the key that partially unlocks the mystery. That it has something to do with it is almost demonstrated, else how can the facts already advanced be explained?—or the additional one that by weighting the Mosses of Caucasus and Mexico, as shown in fig. 5, we produce the setting, and stimulate the swelling of the fruit? I have

even a hint in advance of those not covered over; while seeds that were difficult to set by the usual treatment, set freely by weighting or covering.

Neither is there so much mystery about the rationale of this matter, in view of the numerous facts adduced by Mr. Darwin of the extreme sensitiveness of tendrils to a touch, or to the presence of a single thread of almost gossamer weight, compared with those of which I am writing. If tendrils are modified flower peduncles, it follows that flower peduncles—and if these, why not flowers and young fruit also—are subject to the same laws. And if a touch is sufficient to lead or cause spiral revolutions, may not a steady weight be equally or more powerful in



VINE TENDRILS (SEE TEXT).

berries began to swell. The same fact is strikingly illustrated by the second flower on *Muscad Grapes*. I never remember to have seen one of these sub-peduncles run into a tendril; on the contrary the tendril is often wanting, or changed into a part of the bunch, thus converting it into a "cluster." Another singular fact has often been observed in regard to these, and that is, that however impudently the first crop may have set or swelled off, the second or third successive crops invariably set and swell well. It would be interesting to prove what effect the weight of the first crop had on the first setting and some rapid swelling of the second.

On any plants, the Vine especially, subject to the laws of habit, carrying each succeeding crop more easily after away easy at fruit-bearing—like the example

adapted this course hundreds of times, and always with uniform success.

The woodcut (fig. 5) shows a small branch with a cluster of small fruits, and one weighted. Now, in almost every case the weighted fruit only will swell, and if some of the others attempt to follow its lead it will nevertheless curdle them all. Pressure is as powerful as a weight suspended, and I have often covered our dry setting Melons with an inch or two of warm soil at the period of fructification, and the progress they have made has been quite astonishing and not to be accounted for on the increase of heat or humidity, to which the heated fruits were subjected. The stimulus to growth was so great, that if the fruits were carefully exposed to the light afterwards, they received such a stimulus as to ripen a week or

more a powerful stimulus to growth, a rapid development of size, or a modification of structure? Just as the stimulus of the right arm of a Blacksmith are engaged by exercise, so may fruit be made to swell better by being weighted.

I also believe in the more than magic power of a touch. It was recently in my view that the stimulus of bees and other insects is thus employed in the most marvelous adaptations of nature to ends, as Mr. Darwin has so ably shown in his most profound work on the fertilization of Orchids, they carry the pollen to where it is wanted. But they do much more than that probably. Their mechanical weight and contact with the most vital organs of plants probably quicken them into a higher sensitiveness, and so

