A MURDEROUS PLANT—DARLINGTONIA CALIFORNICA.

The following interesting article was read before the California Academy of Sciences, by J. G. Lemmon:

No plant indigenous to the Pacific coast is more profoundly interesting than our *Darlingtonia Californica*. The eye of the uncultured tourist or listless stock-man, no less than the studious naturalist, is at once fascinated when first its secret haunt is invaded in the fastnesses of the Sierra Nevada. A startling mass of green, yellow and crimson snake-heads, high raised in air and thrusting enormous, flaming, forked, curling tongues in every direction; a developed warning principle in the passive vegetable kingdom; a table-turner upon an old eternity-endured enemy; a coming plotter against an alert foe; an ingenious deluder of the unwary; a cruel murderer of the alarmed; an insatiate vengeance-taker; a bold, watchful, cold-blooded, confederated assassin—the *Darlingtonia* forms a frightful specter of the shadowy swamp, a horrid incubus of subsequent dreams!

"Abhorred shape! That only grace of beauty takes,
And brilliant hues to compass evil."

A CONSUMMATE VILLAIN.

The paraphernalia which the *Darlingtonia* employs for attracting its victims is that of the saloon-keeper and the Cyprian, gaudy colors, ravishing odors, delicious sweets and delightful apartments. Its machinery for destroying them is that of the highwayman and the arch fiend, deceitful traps, tripping obstacles for the feet, smooth declined planes, pointed dagger-thrusts from behind and silent wells of oblivious waters. What of enchantment and bewilderment is not furnished by the many-colored, revolute, honey-coated mustache, inviting to the spacious, vaulted, sugar-lined, many-windowed hood of the large, tall leaves each robust plant provides extra by sending up a long, slender, shining flagstaff and suspending a flaunting array of green, gold and crimson bunting, loosely enfolding nectaries of scented sweets, the curious flower of the *Darlingtonia*. Surely no member of the vegetable kingdom has so remarkable and unmistakable a mission, none steps so far out of its normal state to perform it and none executes its trust with more ingenuity and success.

MODUS OPERANDI.

How the *Darlingtonia* is constructed and the mode and results of its warfare have been made the subject of searching expeditions and elaborate essays by Darwin, Hooker, Gray, Canby, and recently by a fellow member of this academy, Harry Edwards. But I trust that an enthusiastic botanist, whose facilities for observation have been most fortunate, may be pardoned for presenting a few facts, gained, not without many different interviews of this notorious rogue, at various seasons of the year.

Living less than 60 miles from one of the few localities where the *Darlingtonia* is found in its best estate—Butterfly valley, near Quincy—I make yearly pilgrimages to its home, I camp by its battle-ground, I conquer my repugnance to its hideous aspect and its cruel work, become accustomed in time to the stench of its rotting victims and I carefully study its wondrous mechanism. I note its aspects and appliances varying with the seasons. I feed it with other food—flesh, fish, fowl and farinaceous diet, sugar, vinegar, salt, pepper, oils, saleratus, acids, etc. I witness the welcome of agreeable diet, the sickening effect of poisons. I ply it with unusual captives—frogs, snakes, minnows, tadpoles—and note the arrival of new forces or the adaptation of combined powers to meet the new conditions. I recognize the tenacity of purpose, the almost intelligent use of means and reverently I humble my spirit before the revelation of infinite wisdom and power.

THOUGHTFUL INQUIRIES.

I have reported these observations so often and fully, that every year brings increasing inquiries from thinkers in distant lands, asking to have this or that mystery cleared up; or to know if this or that phenomenon is connected with the history of the famous plant. One of the closest questioners is W. M. Canby, of Wilmington, Del. The facts elicited formed the theme of a most exhaustive essay, that was read before American Academy of Sciences and reprinted in most of the languages of Europe.

"WHY ARE THE LEAVES TWISTED ONE-HALF WAY ROUND?"

Was Canby's last demand. It will be the especial object of this essay to answer this question.

To discuss this subject thoroughly and with the expectation of arriving at the truth, we must begin where the zoologist does with his puzzles—with embryology, the infant state. The seed of the *Darlingtonia* is a brownish, hairy, Indian-club shaped object, about three lines long. It would be a fur, but for the flaccid, hollow, barbless hairs. Thrown out in hundreds by the large, bursting pericarps, they fall upon the running water or mossy carpeting of the bog. A seed here and there is caught by its hair in favorable conditions and sends down a tiny radicle in search of a foundation, whereon to erect a unique charnel-house of many tall, feeding funnels. The precursor of the prospective phalanx of rapacious, cylindrical stomachs, is a very innocent looking little affair.

INFANT FORM OF LEAF.

The plumule first develops a thin, flat, falcate, green leaf, about half an inch long. Soon it becomes reddened, tubular and veiny, while a relatively large opening appears at about two-thirds of its length, beyond which extends, curving inward, the slender, dorsally flattened, crimson, naked midrib, representing the true leaf, of which the tube below is the petiole. Along the inner face of the petiole, a broad wing extends from the lower edge of the inclined orifice, down straight to the collum of the root, where it divides and clasps the stock.

This primary leaf is constructed similarly to those of the related *Sarracenia*, except that in the latter genus the true leaf or lamina is short, broad, and is bilobed, or many lobed, and forming a border nearly around the mouth of the pitcher-like petiole. During the first season four of these simple *Sarracenia*-like leaves appear of equal size generally, apparently in a whorl, but inspection reveals their alternate arrangement. All face inward, or rather upward, as the leaves first push out horizontally, then ascend upward. The uncovered opening is favorably presented for the reception of moisture, insects, or any objects obeying the law of gravitation. Also, the mouth parts and interior of the tube are armed with strong hairs, pointing inward, while inspection of the contents reveal minute insects (generally of the *Ichneumonidæ* and *Tinaeen* families), entrapped, drowned in water and being digested by these tiny rogues, thus early playing their little game.

THE TRUE DARLINGTONIA LEAF.

During the second year the creeping, rhizomatic character of the plant is manifested; also, it increases rapidly in size. The whorl of leaves now produced, from one-half an inch to several inches beyond the first whorl, are long and large, two to three inches long by half an inch wide, the whole striated with longitudinal veins, and colored with yellow and crimson. Often, too, the other kind of leaves make their appearance, forming one or more of the first members of the whorl. So very different are they at the very beginning, that it seems impossible that both forms should be found on the same plant. They may be larger or smaller than the infantile form (often but half an inch long), but still they will be perfect types of the true *Darlingtonia* leaf—the twisted petiole, the swelling, light-admitting hood, the small, round aperture facing downward, the enormous, depending, curling, flaming, and, in the season, honey-smeared, two-parted lamina or true leaf.

The fourth year's leaves and all subsequent are all of the vaulted, big-mustached form—the plant is of age, is mature; but occasionally on offsets and runners from weak plants at any age, the infant form of leaf is found, but no graded, transitional stages have yet been detected, though much research has been applied in this particular direction, as bearing upon the popular theory of evolution. The linear, strict petiole, with upturned mouth and long, naked, midrib, always accompanies the infant form, while the adult leaf is never deficient in the least characteristic feature of its wondrous organism.

I should have noted before the manner of vernation or budding. In the bud, the petioles of both kinds of leaves first take form and extension. The midrib of the infant is but a minute, subulate spur; the future mustache of the adult form is a pair of involuted, close-rolled, awl-shaped horns, not unlike those waxen pilose appendages which the incipient dandy sometimes displays beneath his nose.

THE SACCHARINE SECRETION.

Not at all times of the season is a prominent characteristic observable. For several years I did not detect one of the most distinctive features of this insect trap, the saccharine secretion. This phenomenon was not certainly known for several years after the discovery of the plant. On the 4th of July, '75, in company with Mrs. Austin and family, I went to celebrate the nation's holiday beside our peculiarly Californian curiosity, located in a large oval bog in the center of a grove of alders. Much to our surprise, the tall, crowded cobra heads, upreared among snowy *parnassias*, azure *erigerons*, yellow *xanthosmas* and purple asters appeared, dripping with glistening drops of honey. The catching operation was in full progress.

This saccharine fluid, of the consistence of honey, is secreted by glands of the hood, both without and within, standing in beads along the margins of the expanded cells, the translucent windows of the balloon-like hood. It is often so abundant as to unite and flow down, that on the inside into the forward, depressed part of the hood, that on the outside smearing the mustaches completely, in addition to a similar secretion of the latter. Not only was the curling, crimson-streaked mustache smeared throughout, but the border of the wing in its spiral curve half-round down to the root was gemmed with a line of honey globules. These globules in the oldest leaves were crystallized into sugar-plums, forming a not-to-be resisted decoy to the groundling below.

THE WATERS OF DEATH.

So of the watery fluid found in the lower portion of the petioles at times. Only at a certain season—just at the opening of the months above, may this phenomena be detected. The main veins on the inside of the tubes may then be seen gemmed from top to bottom with beads of a water-like secretion, which finally becomes so abundant as to flow down and form the wells of death. When the trap is favorably placed, or the quantity of insects is unusually large, so that the gormand gets his stomach full, or when fed by hand to the top, slowly, with flesh food, the fluid is secreted as demanded by the necessities of the case, and soon fills the tube to overflowing. Late in the season the water is evaporated and only the skeletons, wings, legs, etc., of insects remain—the bones of the carnal feast.

Again the arrangement and different altitudes of the leaves are not at once observed—and cannot be made out clearly from the usual crowded specimens supplied to the herbariums of the world. Only young, vigorous, solitary plants display the typical plan of growth—a plan conformed to the wants, or rather, the wicked designs of the *Darlingtonia*; and here we are brought round to the solution of the question under particular description—

WHY THE TWISTING LEAVES?

First as to the facts. The leaves of mature rhizomes—the true *Darlingtonia* leaves—are each twisted one half way round whatever the length, whether one half inch, or over three feet. All the leaves on one plant turn one way, but exactly half (according to repeated counts by Mrs. Austin and myself,) have leaves turning one way and half the other. The four leaves of the season rise successively to different elevations, the last in time, to the highest place. Each turns half-round and holds out its flaunting lures into space in a direction radiating from the center or axis of the plant. The reason for this twisting of the petiole must be to further the design—the malicious animus of the whole plant's history, to favor the catching of insects coming from all quarters.

The less crafty-related *Sarracenia* and the infant *Darlingtonia* leaf depend on gravitation mainly, for their food, and their mouths bordered indeed with retrorse hairs open upward. The full-grown, full-armed *Darlingtonia*, with its added attractions of gay colors, fragrant odors and delicious sweets, best compasses the wholesale capture of insects necessary to satiate its rapacity, by decoying them into a brilliantly lighted chamber, over the ceiling of which are spread a net-work of honeyed path-ways, bordered, however, and ultimately shut out by hedges of short, stiff hairs that topple the victim from his footing. A high rim prevents return by the aperture. A long portion of the inner side of the tube, commencing just on a level with the edge of the orifice, is smooth as glass, so vainly the poor victim stretches his legs for rescuing aids to stay his descent. About half way down long, stiff, declined hairs begin to be met with, which give way easily from above but close up behind, and with multiplied numbers, as the struggling victim nears the goal, pushes him down to the rising flood, and crowds him beneath the silent, fœted, decomposing waters of oblivion.

THE CLIMAX OF CUNNING.

Now, why the peculiar characteristics of the *Darlingtonia?* Why would not less elaborate machinery answer as well? Let us see: A tube so capacious as to hold a half pint of insects, the usual meal it seems of the *Darlingtonia*, must be very wide or very long. If wide, there would be great expenditure of the saccharine secretion, since it must surround the mouth and smear all the approaches—an expenditure not to be incurred by our economical plant. If long and prostrate, it would be interfered with by other plants, also would be in danger of visitation and robbery by insect-loving animals. If upright and with mouth upturned, it would be above the usual range of insects, while its digesting fluid would be weakened by the reception of rain and dew; but, most of all, other plants are created and set to work on this principle: The wonderful climate and soil of California must be expected to produce a finished insectivorous plant, with all possible improvements; hence, the matchless *Darlingtonia*, with its high reared, inflated heads, downward opening mouths, sugar-plum, winding roads to lead foot travelers up; ingeniously, brilliant and honey-coated decoys to attract flyers; and the enormous mustaches obviously turned outward by twisted petioles to catch the eye of distant voyagers in every direction; no feature of all the host is either accidental, useless or uninteresting.

FALLING MOUNTAINS.

We had an account not long since of a mountain in the Savoy, Switzerland, which from some inexplicable cause suddenly commenced tumbling down and for 20 days went on steadily disintegrating itself until much of it had rolled into the valley below, causing the the destruction of two flourishing villages. While this work of dismemberment was in process it caused a terrific sound and filled the air with clouds of dust. Immense rocks descended the mountain side, a distance of a mile, in 30 seconds, and bounding sometimes 1,500 feet, crushed the great pine forests like thistles. And now there comes from Montana, the story of another falling mountain. In the northern part of that Territory, distant from Helena 30 miles, rises a singular elevation conspicuous for many miles around, called Bear Tooth mountain. It consists, or rather did consist, of two tusk-like peaks, hence the name, standing on the summit of the range, above which, dark and grim, they lifted themselves to the hight of many hundred feet. A short time since a party hunting in the vicinity heard a heavy sound that so shook the earth that they supposed it to be an earthquake. On reaching the Bear's Tooth a little after, they found the eastern tusk had disappeared. This was a perpendicular mass of rock and earth, fully 500 feet high, 300 feet in circumference at its base and about 150 feet at the top. This immense mass had become dislodged, and coming down with the speed of an avalanche had swept through a forest of large timber for a quarter of a mile, entirely leveling it. The country around is now covered with a great mass of broken trees and tons upon tons of rocks, many of them as large as an ordinary house.

PRESERVING WOOD BY THE APPLICATION OF LIME.—The method of preserving wood by the application of lime, as pursued by M. Svostal, is published in the French journals. He piles the planks in a tank, and puts over all a layer of quick-lime, which is gradually slaked with water. Timber for mines require about a week to be thoroughly impregnated, and other wood more or less time according to its thickness. The material acquires remarkable consistence and hardness on being subjected to this simple process, and it is alleged, will never rot. Beechwood has been prepared in this way for hammers and other tools for iron works, and is said to become as hard as oak without parting with any of its well-known elasticity or toughness, and to last much longer that when not thus prepared.

THE LATEST SLANDER.—A writer in the *Western Farm Journal*, with apparent honesty, gives the following as an objection to California: "Another objection is, that the orb of day and of our lives, cannot be seen to rise or set, only here and there except along the coast, where of course it is seen to set. In Iowa there is nothing to hide this grand sight, but the clouds that are necessary for our rains."

On the 8th of March, a snow storm commenced in the Black hills country, and continued until the snow lay five feet deep on a level and from 40 to 50 feet deep in the canyons. A great many houses were broken down, business of all kinds was stopped and a number of lives were lost. Much stock also perished.

A LITTLE girl, suffering from the mumps, declares that she "feels as though a headache had slipped down into her neck."

RAPE OIL FOR IRISH LIGHTHOUSES.—We read in English exchanges of the making of a refined rape oil for the Irish lighthouses.

NOTES ON THE CLIFF DWELLERS OF NEW MEXICO.

During the field operations of one of the parties connected with the United States Geological Survey of the Territories, in charge of Prof. F. V. Hayden, portions of southwestern Colorado, northwestern New Mexico, and northeastern Arizona were traversed, embracing that broken-up country occupied in remote times by a race of people who were known as the cliff dwellers. This subject is well known to readers in general, but we must recur to it again so as to be able to reach the importance of the discovery to be described.

In one of the canyons, known as the Chaco, Mr. W. H. Jackson made detailed investigations and measurements of the immense ruined buildings. In one of the arroyas or dry water courses, the sectional view of the alluvial deposit was exposed to a depth of about 16 feet. Fourteen feet beneath the surface, a layer of pottery and debris came to view. This may not seem strange, as, in a comparatively narrow valley, dirt and gravel to the depth of 14 feet might be deposited in a short term of years. But, 10 feet above this layer, the foundation walls of ancient buildings were visible, built upon another layer of gravel and sand. These were in times covered with the alluvium upon which now stand the famous ruins, of which no history is extant, and of the builders of which no history will ever be known. How many ages have passed since the lower or first bed was the surface, upon which moved the numerous hordes of which all evidence at present is hidden behind the veil of the dark past?

Now, a skull comes to view upon the layer of pottery, which is beneath two eras of occupation and semi-civilization. This skull, in its contour, is unique. Its closest relations are the ancient Mexicans, Peruvians, Caribs, and Natchez. There is an extraordinary flattening of the upper posterior portion of the head (posterior parietæ), which is evident in those figured in Morton's "Crania Americana." The contents of the skull as found, consists of sand, which is now as hard as ordinary agglutinated sandstone, and has in nearly all portions, the appearance of liminite. The skull will be described and figured by Dr. W. J. Hoffman, of the Hayden Survey, and it affords another strong link in the chain of facts and hypotheses of the cliff-dwellers and the ancient Mexicans being more nearly related than is generally admitted or supposed.

LAMPS FOR ELECTRIC LIGHT.—The improvements proposed by Messrs. Prosser and Moore, of Chelsea, England, consists in the modes of combining and mounting the electrodes, also in the mode of forming them and in the means of bringing them successively into action in such manner as to prevent the suspension of the current of electricity and consequent extinction of the light, arising either from defective electrodes or other accidental causes. The extinction of the light would, therefore, be entirely avoided and the electric current, together with the light, be automatically maintained. As by our ordinary modes of arranging the electrodes, we require only two electrodes to be in action at one and the same time, we cause those not in immediate action (where we employ a plurality of them) to be completely insulated and cause the electric current to pass through the opposing electrodes, the electric fluid being conducted through an ordinary feeder from the battery and connected with the electrodes by means of a spring commutator or other connector of platinum or other suitable metal, which, preserving contact by pressing upon the electrodes in immediate action, is so arranged and adjusted that when it is necessary to change or shift the electrodes from any cause, contact shall at once be effected with the succeeding electrodes, so that the perfect continuity of the electric current, and, consequently, of the light shall be maintained.

A NEW LECTURE EXPERIMENT ON PRUSSIC ACID.—A very simple method of showing that there is no free hydrocyanic acid in the kernels of peach, cherry and plum stones, or bitter almonds, but that it is formed on heating the same with water, is given in the *Polytechnisches Notizblatt*. A long strip of Swedish filter paper is soaked in tincture of gum guaiacum (1 to 20) and dried. It is next passed through a solution of sulphate of copper diluted 2,000 times, when the paper will not be changed at all in color. A few freshly-pounded bitter almonds are put in a two-liter flask with water. On suspending in it the strip of test paper above described, the paper will remain white, but on pouring into the flask a single crushed bitter almond that has been *warmed* with water, the test paper will at once be colored blue by the hydrocyanic acid generated in the flask, without bringing the paper in contact with the liquid. This experiment, unlike most of those which can be shown with hydrocyanic acid and its salts, is free from danger to the experimenter, and involving no risk or expense deserves the attention of teachers of chemistry.

SODIUM AMALGUM.—For the preparation of sodium amalgum without danger, Mr. Henry N. Draper recommends, in the *Chemical News*, that the mercury be allowed to run in a thin stream to the melted sodium held in a bath of paraffine. The quantity of mercury added depends whether solid or liquid amalgam is desired. The former congeals sooner than the paraffine, and the latter can be poured off. The paraffine still adhering to the amalgam is washed off by means of ether.

ONION JUICE FOR STINGS.—The *Berliner Presse* says that the pain caused by the sting of a horse-fly may be instantly alleviated, and the swelling which often accompanies it speedily reduced, by simply rubbing the injured part with the juice of an onion. Probably it would be a useful application in the case of other insect stings.

GEM FILTER.—Dr. Angus Smith finds that cotton wadding between two layers of cotton cloth is an effectual filter for fungus spores in the air, and that even flour paste, left in an enclosure of such material for days, developed no fungi whatever.