Improvement in the Manufacture of Ultramarine.

R. W. E. McIvor has found the following proportions of raw materials to yield excellent results: Sodium sulphide, 42 lb.; sulphur, 20 lb.; kaolin (China clay), 110 lb.; soda (as carbonate), 106 lb.; or caustic soda, 40 lb. These quantities yield about 2 cwt. of ultramarine blue. The clay and soda are first roasted together at a red heat so as to effect partial double decomposition, and the product is ground. "Sulphur liquor" is then made by dissolving flowers of sulphur in a solution of sulphide of sodium to saturation. The ground material is then made into a thick paste with the sulphur liquor, the paste dried in an oven, and the dried mass broken into small pieces is roasted without access of air in a closed earthenware retort first at 250° to 300° C. for an hour, then at a red heat for eight hours, and finally just below dull redness in presence of a slow regulated current of air. The retort must be quite cold before being opened.

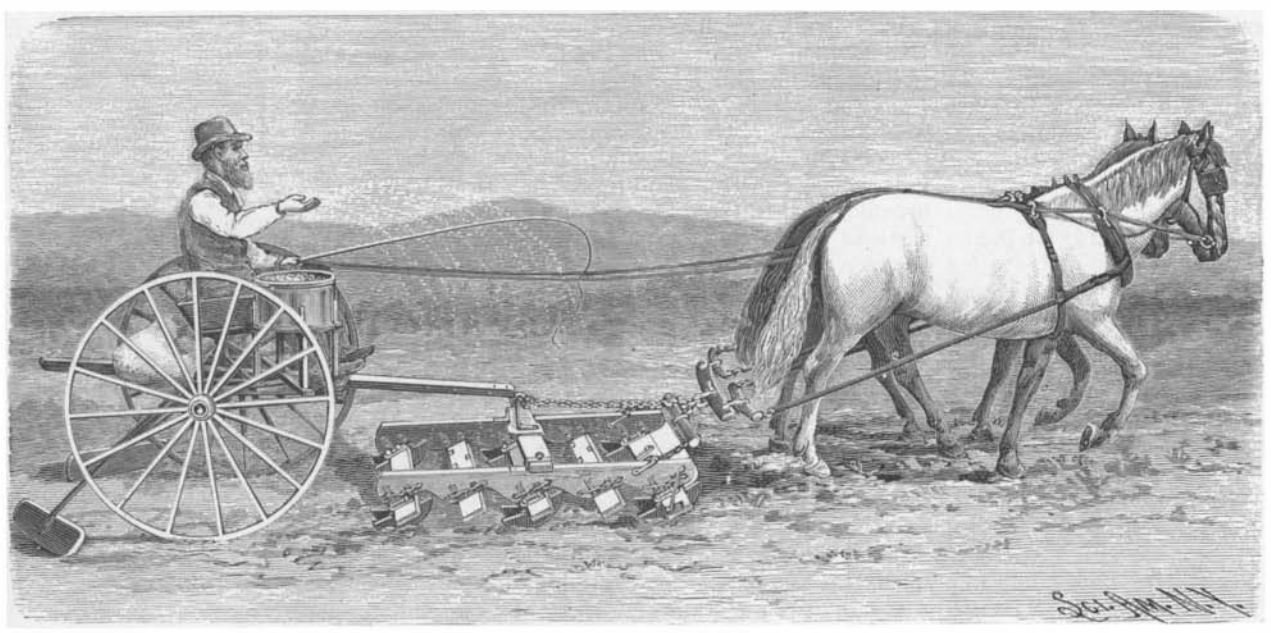
Sugar.

The States now producing sugar and the raw material from which they produce such sugar are as follows:

California	Beets.
Utah	Beets.
Nebraska	Beets.
Pennsylvania	Beets and maple sap.
Virginia	Beets.
Texas	Sugar cane.
Louisiana	Sugar cane.
Florida	Sugar cane.
Kansas	Sorghum.
Missouri	Sorghum.
Minnesota	Sorghum and maple sap.
Michigan	Sorghum and maple sap.
Iowa	Maple sap.
Wisconsin	Maple sap.
Illinois	Maple sap.
Ohio	Maple sap.
West Virginia	Maple sap.
New York	Maple sap.
Maryland	Maple sap.
Massachusetts	Maple sap.
Vermont	Maple sap.
New Hampshire	Maple sap.
Maine	Maple sap.

A PULVERIZING HARROW AND CULTIVATOR.

The improvement shown in the illustration is designed to form a perfect pulverizer, doing the work of a harrow clod crusher and roller combined, while it prepares a perfect seed bed, deep, fine, smooth, and even as a floor, and cleans foul fields of weeds and vines so that they may be plowed under without trouble, the plow not being required at all in many cases. The forward frame of the machine, which carries the pulverizers, is connected by a pole with the axle of a wheeled carriage, and the frame has a series of inclined drag bars, adapting it, when the pulverizer blades are removed, to the smoothing of lawns, roadbeds, etc. The pulverizer blades are preferably of steel, and are attached to a head stock, as shown in the small views, two upwardly extending studs of the stock passing through perforations in the drag bars, to which they are secured by pins or keys. One of the paired cutter blades crosses the path of the other, and presents an acute angle to the ground surface, designed to cut through it readily, and ride upon or cut off small roots, vines, stalks, or similar obstructions, or bury them in the soil, while the shape of the blades is such that the entire device will ride over a rigid obstacle. The edges of the blades are beveled on the outside, to render them self-sharpening as they are drawn through the soil. Extending rearwardly from the wheeled carriage are rods carrying drags, by which the marks made by the wheels are covered. The machine can be taken apart and put together, or changed from one combination to another, without the use of a tool or the exercise of any degree of mechanical skill. It is designed to be inexpensive to manufacture, and not likely to get out of order with severe use, while it can be readily taken apart and packed, except the wheels, in a box about six feet long by ten inches square.

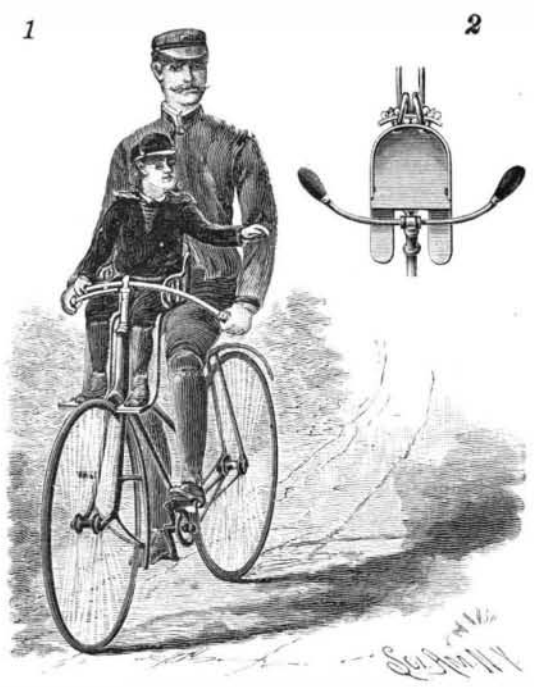


L'HOMEDIEU'S CULTIVATOR AND PULVERIZING ATTACHMENT FOR HARROWS.

This improvement forms the subject of two patents issued to Mr. John P. L'Homedieu, of Setauket, Suffolk County, N. Y., to whom application may be made for further particulars.

A SEAT ATTACHMENT FOR BICYCLES.

The illustration represents an extra seat attachment for bicycles, which may be readily put on or removed, adapting the vehicle to hold a child in front of the rider in such a manner that it cannot fall out and will not unbalance the machine, while it may also be adjusted to suit children of different sizes. This improvement has been patented by Messrs. Louis Rastetter and Crist Siebold, of Fort Wayne, Ind. The child's seat may be placed on any common form of bicycle, being shown attached to a safety of the usual style, and it is supported at the back by the spring of the main seat, a cleat passed through the front coil of the spring being secured to the back of the attached seat, from the lower front portion of which braces extend downward and forward, and are bolted to a support secured to the steering fork and the main frame. Fig. 2 is a plan view of the attached seat and its supports, the foot rests extending in a nearly horizontal position on each side of the fork, and the rear portions of the foot rests being bent upward and clamped to depending hangers, the clamp being adjustable to suit children of different sizes. The handle bar extends around the front of the seat, forming a secure guard to prevent the child from falling out, and when the child is not to ride the seat may be easily removed and the bicycle used in the ordinary way. By this method of attaching the seat, the child has a foot on each side of the fork, and has the same swinging motion as the operator, the weight of both coming together upon the saddle, whereby the child fully partakes in the healthfulness of this form of exercise.



RASTETTER & SIEBOLD'S BICYCLE SEAT.

The Physical Action of Odors.

The direct action of odors on the nervous centers is a subject worthy of careful research and study. Goethe had a strong dislike to the odor of apples; Schiller liked the odor. Some persons are made absolutely ill by the odor of onions that are being cooked; while other persons rather like it. The odor of the lily has a most potent effect in many instances, and I believe there is no person on whom it does not produce a sense of depression and nausea. I have known it cause positive faintness. I am myself always disagreeably affected by the odor of carbolic acid, and can never remain many minutes in a room where a trace of it prevails. In cases where the effect of an odor is instantaneous, it is fair to suppose that the impression made on the olfactory surface is transmitted direct to the olfactory center of the brain; but there must also, in certain examples, be a further transmission to the sympathetic ganglia.

The central seat of the olfactory sense must be very near to the central seat of memory, for it is noticeable that nothing recalls a past event like an odor. A little child was accidentally thrown out of a pony-carriage in a country lane. Near the spot where the fall took place there was a manure heap, which gave forth the peculiar dry ammoniacal odor so often recognizable from such heaps—an odor distinctive yet not altogether unpleasant. The child was stunned by the fall, and on recovering and returning to consciousness smelt this odor powerfully. Over fifty years have elapsed since that little mishap, and yet whenever the person referred to passes, in country lanes, a heap giving out the same odor, the whole scene of the accident recurs with every detail perfect, and sometimes with a recurrence of the giddiness and nausea which were experienced at the moment.

In some of the lower animals memory by odors is often singularly exhibited. In the dog the memory by odor seems a special part of the nature of the animal. The "scent" of the fox-hound and of the stag-hound is of this character. In the trained collie the remembrance of an object hidden, a stick, for instance, may be retained for three-quarters of an hour, so perfectly that the animal will fetch the object at command. But if the object be coated with something giving an odor which the animal is familiar with, the time is infinitely more prolonged.

Some odors lead to sleep, like the odor from dried hops; others lead to wakefulness, like the odor of dead flowers or leaves. Still others allow sleep but provoke the most terrible dreams, like the odors arising from a pillow in which feathers are decomposing.

Habit modifies the effects of odor. Merciless smokers laugh at the "faddery" of women who become faint if a smoker charges the air they breathe in a confined space, a small room or a railway carriage, and are ready to compare the objection of a lady unaccustomed to the odor from the pipe or cigar with the carelessness on the matter shown by another lady who has become accustomed to the effect. But if a smoker gives up smoking and all contact with smoke for a few years, he is astounded at the unpleasantness of an air charged with smoke when he is then inclosed in it. I was once summoned, professionally, to a youth who was temporarily poisoned by inhaling the atmosphere issuing out of a small window of a clubroom in which a number of men were smoking freely. They, in the body of the smoke, were not perceptibly affected. He, partly in the open air, was positively smitten to faintness by the empoisoned current from the room which flowed out of the window, and is still affected whenever he comes within the cloud of a pipe.—*Dr. B. W. Richardson, in the Asclepiad*

To Remove Rust.

To remove rust from iron or steel utensils the following solution is applied by means of a brush, after having removed any grease by rubbing with a clean dry cloth: 100 gm. stannic chloride are dissolved in 1 liter of water; this solution is next added to one containing 2·5 gm. tartaric acid dissolved in 1 liter of water, and, finally, added 20 c.c. indigo solution diluted with two liters of water. After allowing the solution to act for a few seconds, it is rubbed clean with first a moist cloth, later with a dry cloth; to restore the polish, use is made of silver sand and jewelers' rouge.

Aerial Navigation.

To the Editor of the Scientific American:

In the September number of the *Century Magazine* is an interesting article on the Possibility of Mechanical Flight, by Prof. Langley of Smithsonian Institution, and states that the greater the velocity acquired in translating matter in a horizontal direction supported by a plane of slight inclination, the greater weight it will carry and that there will be an increasing economy of power.

Or to use his own words, it requires less and less power to maintain this horizontal position, the faster it goes.

Then, again, the more speed is increased, the less will be the power required to support and advance it. So there will be an increasing economy of power with each higher speed, up to some remote limit not yet attained in experiment. This is in startling contrast to all that we are most familiar with in land and water transportation, where every one knows the direct reverse to be the ordinary case.

Prof. Langley is correct, but we have one instance in mechanics that proves this theory, and that is an engine drawing a train of cars on the level railway, for it takes less power to keep up the required speed after getting into motion. And corresponds with Newton's 2d Law of Motion, that a *constant* force produces a uniform acceleration of velocity in any direction.

Or in other words, let any force with an intensity capable of moving any mass or body, be it ever so slow, be constantly applied, there will be a uniform acceleration, as when a sphere or rolling stock allowed to roll down an incline plane or railway of 1 ft. fall in 16 ft. length, it will pass through the space of 1 ft. in 1st sec., 3 ft. in 2d sec., and so on, increasing at the uniform rate of 2 ft. per second and in one-half minute or 30 seconds it will be moving at the rate of 59 ft. per second. The air is no denser in the same altitude to matter moving in a horizontal direction than in the perpendicular fall.

One horse power has capacity of raising 550 pounds 1 ft. high in one second; let it be constant, the velocity will increase 2 ft. per second toward the zenith.

Again, let gravity be 1 unit, and a force with an intensity representing $1\frac{41}{100}$ units act at an angle of 45° above the horizon; under Newton's 2d Law of Motion, it will move in a direct horizontal line of 16 ft. in the 1st second, 48 ft. in the 2d second, 80 ft. in the 3d, fulfilling the law of falling bodies, or falling in a horizontal direction. FRANK BARNETT.

Keokuk, Iowa, October 16, 1891.

The Albatross.

At one of the meetings of the Wellington Philosophical Society in 1885, Sir Walter Buller, F.R.S., exhibited a series of the so-called wandering albatross, and expressed his belief that there were two species under the common name of *Diomedea exulans*, one of them being highly variable in plumage and the other distinguished by its larger size and by the constancy of its white head and neck. But, although that was his conviction, he did not feel justified in setting up the new species and giving it a distinctive name until he could produce incontestable evidence of its existence. From a paper read by him before the same Society in February last, and published in the new volume of the Transactions of the New Zealand Institute, we learn, says *Nature*, that he had lately had an opportunity of examining sixteen beautiful specimens of both sexes and of all ages, and that as the result of his study of these specimens he had no hesitation in speaking of a new species. "It is undoubtedly," he says, "the noblest member of this group, both as to size and beauty, and I have therefore named it *Diomedea regia*." He exhibited before the Wellington Society a series of both species, and in the course of some remarks on them stated that they keep quite apart from one another on their breeding grounds, and do not commingle "except when sailing and soaring over the mighty deep, where a community of interest and a common pursuit bring many members of this great family together."

In the paper in which he deals with the species called by him *Diomedea regia*, Sir Walter Buller refers to a remarkable characteristic of the wandering albatross—a characteristic which has been carefully studied by Mr. Harris. At a certain time of the year, between February and June—Mr. Harris cannot exactly say when—the old birds leave their young and go to sea, and do not return until October, when they arrive in large numbers. During their absence the young birds never leave the breeding ground. Immediately after the return of the old birds, each pair goes to its old nest, and, after a little fondling of the young one, turns it out, and prepares the nest for the next brood. The deserted young ones are in good condition, and very lively, frequently being seen off their nests exercising their wings; and, when the old birds come back, a young bird will often remain outside the nest and nibble at the head of the old one, until the feathers between the beak and the eye are removed, and the skin made quite sore. The young birds do not go far from land until the following year, when they accompany the old ones to sea. When the young are left in the nest at the close of the breeding season, they are so immensely fat that Sir Walter Buller thinks they can subsist for months without food of any kind. Captain Fairchild has described to Sir Walter from personal observation the coming home of the wandering albatross, and the peremptory manner in which the young bird in possession is ordered to quit the nest, so as to make room for its successor.

Anthophagy.

A writer in *La Nature*, quoting from Ovid,

"Qui amat flores reputatur
Amare puellas,"

says that it is well to-day to modify this aphorism and to say: "Those who love flowers are friends of good living." It appears, in fact, that in France as well as in England a true crusade is going on at present for the introduction of a certain number of flowers into our regular list of foods.

It was some London botanists who conceived this eccentric idea of rendering us *anthophagists*, a word which may be translated "eaters of flowers."

If the learned Englishmen succeed in their enterprise, we shall very soon see the edible flowers of the phog (*Caligonum polygonoides*), of the mahwah (*Bassia latifolia*), of the *Dillenia pentagynia*, etc., appear upon our tables and triumphantly take their place alongside of the violets, jasmins, and rose petals that we have long been receiving from Italy in the form of preserves.

In fact, in spite of our English neighbors, who would like for once to obtain the reputation of being initiators, flowers have been daily eaten by everybody for a long time.

Anthophagy is assuredly one of the commonest of practices; but ordinarily we are anthophagists without knowing it. The experimental proof of this assertion is soon and easily found. Thus, for example, when we eat the artichoke with peppersauce, we are eating the immature flower heads of the plant, and when we partake of a common cauliflower with buttersauce we are eating flowers.

The cabbages, like the artichoke, are plants of many possibilities.

See, in fact, what we owe to the *Brassica oleracea* alone—the common cabbage—which the housewife daily puts into the soup pot.

In a wild state, the *Brassica oleracea* is a rare plant, at least in France, where it is scarcely ever met with except in the inaccessible parts of the chalky shores of Cape Gris-Nez. In order to develop at its ease, it requires sea air, saline spray, and phosphate of lime. But when man comes to take it under his protection, then, according to the mode of culture applied to it, it furnishes the common cabbage, the turnip cabbage, the cauliflower, Brussels sprouts, etc., according as the leaves, root, or flowers of the plant have been more especially developed. This latter is especially the case of the cauliflower and Brussels sprouts. The cauliflower, in fact, is nothing but the plant's inflorescence which has not reached its complete development, while Brussels sprouts are buds that have not reached perfect maturity. To add again to the list of Brassicas, there is the brocoli, a maritime and wild (or nearly so) variety of the *Brassica oleracea*, and the inflorescence of which, less tufted than that of the common cauliflower, is likewise edible and just as delicate.

In Holland, as well as in Brittany, the brocoli is cultivated upon a large scale in the *polders* (as the large pasturages on alluvial soil that has been reclaimed from the sea are called in the Netherlands), and, in order to secure for it an existence approaching as nearly as possible its normal conditions of growth, the peasants furnish it with a manure that is both mineral and organic; that is, the star-fishes that they gather by the cartload upon the beaches. Let us add, further, that the crop of brocoli inflorescences is placed in casks that have contained the generous wines of France (Burgundy or Bordeaux). This gives it a particularly fine and agreeable aroma, and it is afterward shipped to England, whence we see it finally return to our tables in the form of pickles in vinegar or of chow-chow. So much for the simple cabbage.

As for the artichoke, the *Cynara scolymus* of botanists, that shares, with several other of its near relatives, the property of having a fleshy and succulent floral receptacle. These flower-vegetables of which we have just spoken are in general use as food. Along with them, it is well to mention a number of others, which, although not so well known, are none the less valuable. Thus, for example, the sea kale (*Crambe maritima*), a near relative of the cabbage, belonging, like it, to the great family of Cruciferæ, and which grows naturally and in great abundance at the seaside, in the shingle, upon our Channel coast, produces an inflorescence that is particularly esteemed by connoisseurs. It is a vegetable of which the culture will doubtless be carried on regularly some day.

The most diverse families of plants furnish species having edible flowers. The delicately perfumed, freshly expanded flowers of the yellow pond-lily (*Nymphæa lutra*) are employed in the east of France in the manufacture of certain preserves that possess an exquisite flavor. The white and odoriferous racemes of *Robinia pseudacacia*, dipped in batter are used in some countries for making fritters that are no less savory than those made of sliced apples or peaches. The flowers of the Judas tree (*Cercis siliquastrum*), too, are sometimes made into fritters with butter, or are mixed with salads, and the flower buds are pickled in vinegar. The flowers of the American species (*C. canadensis*) are used in salads and pickles in Canada. The flowers of the nasturtium and borage are used as an addition to salads. We use the flower buds of the caper bush, preserved in vinegar, in certain sauces. The cloves, so much used for flavoring, are merely the unexpanded flower-buds of the clove tree, dried in the sun.

The flowers of *Abutilon esculentum* are used as a vegetable in Brazil. In India, the flowers of *Agati grandiflora* are used by the natives in their curries. The flowers of the pumpkin vine are cooked and eaten by some of the tribes of North American Indians. This list is far from being complete, and we hope to add to it at some future time.

The Original Cable Road to be Improved.

The Clay Street Hill Railroad Company, San Francisco, has run its last car up through Chinatown, over the Clay Street hill, and with it the oldest cable road in the world is now a thing of the past. No unusual ceremonies attended the final trip, beyond the breaking of a bottle of champagne over the grip and a formal declaration that the business of the pioneer cable road was finished, but after the car and dummy had been turned into the round house many of the officers and men, some of whom had been with the road since its construction was begun, over twenty-five years ago, gathered together and exchanged bits of history concerning the early days of the famous line. Deep regret was expressed by all that it had become necessary to dismantle the road and reconstruct it, that it might be adequate to handle the growing traffic.

Up in the loft of the old engine house, corner of Leavenworth and Clay Streets, are stored parts of the first dummies which astonished the people of San Francisco, together with the original grip car. This is indeed a primitive affair, consisting of a low platform on small car wheels and supporting the grip. A rough railing surrounds it, while the brakes consisted of steel levers, which were pressed against the four wheels. Five men were necessary to run the dummy, one operating the grip and each of the remaining four standing with a steel lever in his hand ready to lock the wheels should the grip break. The trailer was a common "bobtail" horse car, and the trial trip of the first cable train, as thus constituted, forms a most interesting chapter of street railway history.

Early in the '70s, A. S. Hallidie, now president of the California Wire Works, of San Francisco, conceived the idea of propelling street cars by means of an endless, traveling, underground cable. The scheme was at first considered chimerical, but finally three men of means—Joseph Britton, H. L. Davis, and James Moffitt—took the matter up. Then came the almost interminable task of working out the mechanical details of the idea, but it was finally completed, and on August 18, 1873, hundreds of San Franciscans climbed up Clay Street hill to watch the trial trip. As the gripman who was to take the car over the road looked down the steep decline his courage failed, and Mr. Hallidie took the grip. At a given signal the car started off smoothly amid shouts from thousands of throats. The trip was made without a hitch and the innovation was pronounced a success. Soon the line from Kearney Street to Van Ness Avenue was equipped with cable cars, and since then, until the closing of the line on the night of September 9, the road has been in operation, using continuously the same engine and the same roadbed. Arthur S. Chase enjoys the distinction of having collected the first fare, he being the first cable car conductor, and Timothy Phalon was the first gripman. Mr. Chase is now in the furniture business in San Francisco, and Mr. Phalon, after a long service, resigned and is now a factory watchman.

The *Western Electrician* says: It is probable that the now historic train, with its first conductor and gripman, will form a part of California's exhibit at the World's Fair.

Our Walrus-Eating Citizens.

Mr. Ivan Petroff, the United States special census agent, has been engaged in taking the census of the natives of Nunivak Island, in Behring Sea, in 60° N. lat. He found the population to consist of over 600 natives. It was previously supposed that over 300 people occupied the island. There are no white men there, and the natives live in a most primitive style. Their only food is the flesh of the walrus, and their only wealth consists of ivory obtained from the tusks of that animal. There are few land otter, but, apart from these, the natives catch no fur-bearing animals.