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Improved Flying Machine.

When mankind are able to travel through the air in any direction, it will be due to the ingenuity of inventors in overcoming natural objects. What these obstacles are, most intelligent persons already know. The idea of soaring above the heads of the multitude, and of traversing the trackless wastes of the atmosphere, is so fascinating, both to the inventor and the enthusiast, that it is no wonder that each should anticipate the pleasures to be derived from it, and ponder upon its advantages as well. From Roger Bacon, a philosopher of the year 1300, down to experimentalists of the present day, each and all have been busy in devising plans and machinery wherewith to sail through the air as swiftly and as safely as birds. Some theorists (for as yet the art of travelling in balloons is practically a theory, to speak paradoxically), are content with merely inflating a sphere, and allowing it to be borne by currents of air, which they maintain exist at certain altitudes, and which blow as the Gulf stream flows—in one direction, at certain seasons of the year. Other persons, however, not content with this method of aerial progression, fitted their balloons with machinery, which, acting on fans or vanes, inclined at certain angles with the side or at the stern of the balloon, was intended to impel the same through the air at a rate of speed impossible to achieve on land. At the present writing we cannot recall any instance, on indisputable authority, where such contrivances have succeeded.

The failures, however, may have been owing to defective apparatus, or a want of scientific knowledge; without which the most sanguine æronant must inevitably fail. The aerial car herewith illustrated, is not, strictly speaking, a balloon; but is an elongated conoidal cylinder, A, having machinery for its operation and propulsion through the air, contained in a car, B, in the lower part of the cylinder. The frame of the cylinder itself is constructed of split rattan, woven in the same manner as a chair bottom, and having the ends of the rattans joined in a rope which runs fore and aft the machine. Outside of this frame there is a covering of silk, as in other balloons. On the platform, B, is placed the propelling machinery, which consists of a cylinder fitted up in all respects similar to a steam engine, having a piston which reciprocates up and down, through the medium of the valves contained in pipes, a. This engine is to be driven by compressed hydrogen gas, generated for the purpose in the vessel, C. The gas is exhausted into the condenser, D, after it has passed through the engine and moved the piston. This engine drives the fan wheels, E, contained in either end of the balloon, the fans of which are set in gas-tight drums, G, filled with hydrogen gas; the whole being driven through belts or other agents suitable for the purpose. The office of these fans, as the reader has doubtless discovered ere this, is to forcibly expel air through the tubes, H H, to the rear of the balloon, and in this manner propel it through the air, in the same way that a rocket travels; indeed it will be seen that this is the idea upon which the inventor has worked, the form of the machine being similar to that of the projectile mentioned. A steering wheel, I, is connected to a rudder, J, at the stern, and it is claimed that by this means the direction of the machine can be altered at will. Fig. 2, is a plan view of the engine, generator, condenser, &c., in which similar letters refer to like parts. The inventor's plans with reference to his scheme are very fully set forth in our advertising columns. It will be seen, on referring thereto, that he proposes to revolutionize the present method of communicating between distant points; and to completely annihilate time and space. If he accomplishes a tithe of what he expects to, he will be a benefactor of his race. This aerial machine was patented through the Scientific American Patent Agency, on June 3, 1862, by Arthur Kinsella, of Cascades, Washington Territory; further information respecting it can be had by addressing him at that place.

Fig. 1

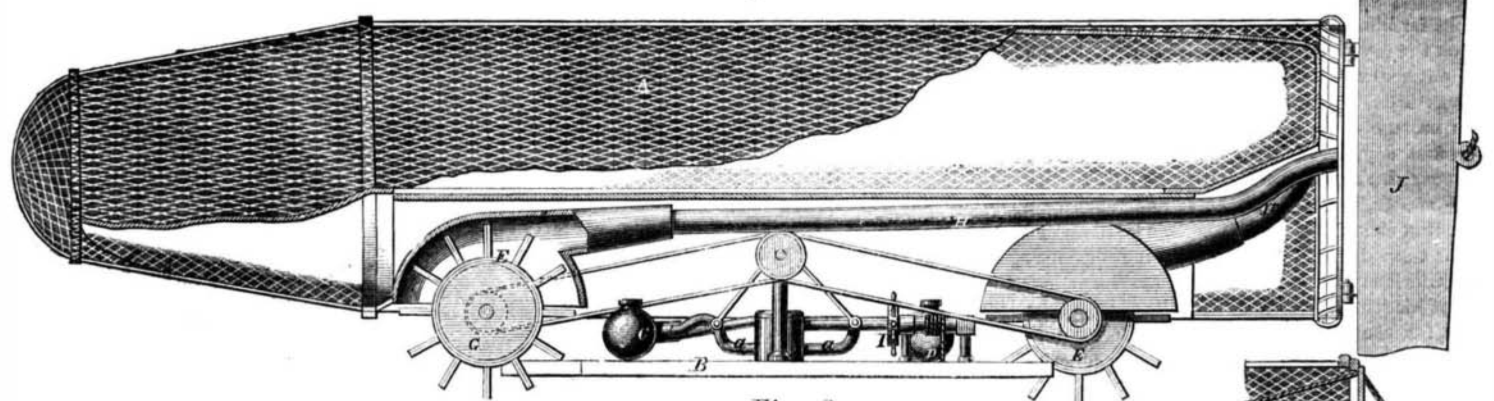
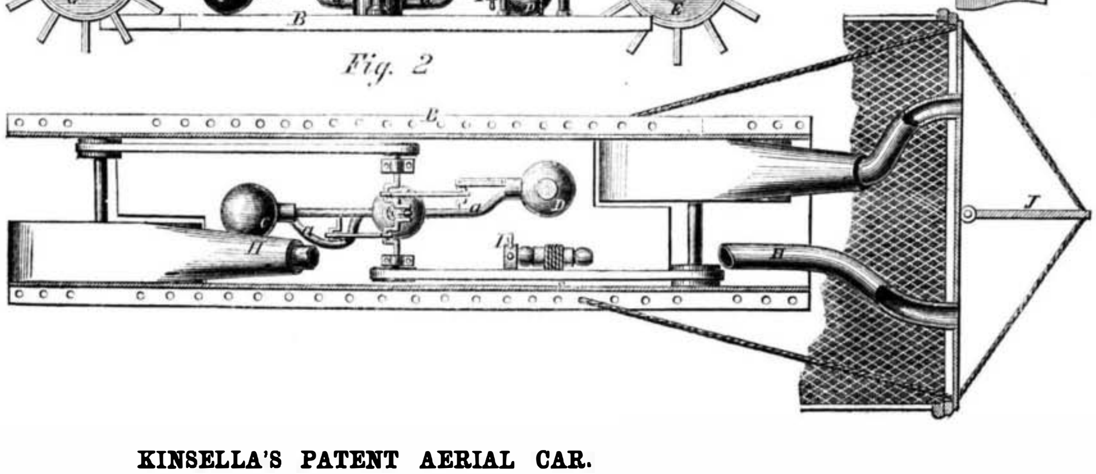


Fig. 2



KINSELLA'S PATENT AERIAL CAR.

New Rifled Gun.

It is claimed that the Ferris gun, a newly invented weapon, gave a speed of 2,200 feet per second to its shot, as measured by the electrobalist at West Point. The gun was tried in the presence of numerous officers of high standing in the army. The highest velocity ever obtained before was with a Parrott gun, the speed of the projectile from which was 1,800 feet per second. The Ferris gun obtained its high velocity from the quantity of powder burned in it, which is, in a $1\frac{3}{4}$-inch bore, 24 ounces, while the shot weighs 40 ounces—rather more than half the weight of the shot. At this rate the 100-pounder would require 60 pounds of powder, and the 200-pounder nearly 100 pounds—a fearful charge, certainly.

PROPOSAL TO THE GOVERNMENT.—Horatio Ames, of Falls Village, Conn., proposes to make for the Government fifty 300-pound rifled cannon, to carry a 100-pound charge of powder; price of the weapon $1 per pound. The guns are intended to be nearly 10 inches bore, and weigh 30,000 pounds a-piece. They are intended to stand 1,000 rounds without bursting. We presume there are a great many forges willing to make such guns on similar terms.

What Patience and Energy can Accomplish.

The following narrative is valuable, not alone for the entertainment it affords the reader; but as an evidence of what may be done in the world by a determined, patient man. Young men who think the world owes them a living, should cast about in every direction, and make the world pay its debts in a legitimate way; and they may have the satisfaction of becoming as wealthy as the hero of the sketch. It is a true story.

Once upon a time there was an old soldier, and he is alive yet, named Chapellier. Discharged and poor, he had made it his business to live by what he could find in the gutters of the streets of Paris—horse-shoe nails, on lucky days perhaps even a horse-shoe—iron toughened by much tramping, dear to the gun-maker—poor scraps that, with help from odd street jobs in opening carriage doors and so forth, enabled him to support life. But he sought advancement, and soared from this calling into the service of a wholesale chiffonier, whose baskets he sorted, and in whose warehouses he arranged the stores, till he fell sick, overpowered by the smell of the articles in which his master traded, and went into the hospital. When he came out he hired himself to a poultry merchant, and earned forty sous a day by filling his own mouth with peas, and then putting them out of his mouth down the young pigeons' throats, to fatten them suddenly. But while here he thought on the fact that a poultry merchant did not get the full price for his birds, unless they were sold fresh killed on the day of their arrival. However sweet a bird might be, every cook saw at a glance whether it was fresh killed. How was that, he inquired. Oh, that is because the feet that are brilliant and black at the first day, become grayer and duller at every day afterward. The wise Chapellier having reflected on this matter, made experiments, and invented a varnish that should keep the birds' legs brilliant and black for many days. There was a stir in the poultry trade. Glorious was the invention, and Chapellier, who kept his secret, went about painting the feet of poultry for the fee of twelve and a half per cent, upon all sales of second day's stock. So he made money, but it was as an itinerant professor. His desire was to be the head of an establishment. He retired, therefore, from the claw-painting business; having sold his secret and connection in the trade for forty pounds, to a friend who has since made a fortune by it.

What should he do? Would his old master the chiffonier, take him into partnership? He would go and ask. He went and asked. Not without a premium of two thousand pounds. Chapellier could not afford that; but while he was in the warehouse he was struck by the great number of unsaleable pieces of waste bread brought in the baskets of the rubbish hunters. Here was an idea—and this is the lesson for your cook and for your children. This great man went out and bought a donkey and a cart, and having hired a large room, went with his donkey-cart to all the cooks of schools and colleges and large establishments, to propose a purchase from them of all the stale scraps of bread they had been used to throw into the street. They cordially hailed the idea of a new perquisite. Chapellier then bargained with the scullions of the eating houses, and with all the chief cooks of the city, that he might have the dry crust and scrap, destined to be thrown into the street. He also contracted with the scavengers for all the bread they found, in dust holes and gutters.

Having secured his monopoly, this laudable person took his stand one morning in the middle of the chief market of Paris, with a placard on his hat inscribed, "Bread crusts for sale." The Parisian keeps rabbits; and the rabbits require bread as well as cabbage; the chickens fed for market, also require bread crumbs. Many domestic pets of the wealthy are, in Paris, denied meat; and so, from one source and another, came a large demand for bread crusts, sold at three cents a basket full. In four months he had three horses and three wagons to work. In a few years, he sold his business, and retired with a competence. But it was only to come back in a month or two. Refinement on his old idea had occurred to him, and he could not rest until he worked it out. He had seen enough of cooks and sausage-makers to observe the value of bread-crumbs, for strewing over cutlets, and for other purposes. Bread crumbs made of stale bread, pounded and grated, fetched fourpence per heaped quart. He would turn his stale bread into bread crumbs, and sell that at threepence per the heaped quart. It was rather hard on his successor, to be sure, who was ruined in the trade he had bought. But what was to be said? Bread-crumbs are not crusts, and Chapellier was a great creature. As manufacturer of bread crumbs, then, a mighty trade was driven. But the bread of which the crumbs were made was some good and some bad. It would not pay to separate the good from bad, but it would pay to establish ovens, and sell the crusts, baked in lumps or grated for the use of cooks, as "croutes au pot." Except the best houses, these preserved scraps find their way into almost every Parisian's dish. The burnt bits and scrapings are pounded and sifted to be sold to the perfumers, who will make them into tooth-powder. And thus the Pere Chapellier made his fortune. Now, my good (or bad, as the case may be) cook, and my dear children, you observe that a large fortune is to be made by dry crusts and mouldy scraps of bread, and yet you throw them away!—*All the Year Round.*

Colored Light and the Eye.

The following speculations on light are by B. S. Barnard, in the *Photographic News* (London):—

"'As white as fine linen,' 'as white as snow,' are frequent comparisons; but they are all dull examples as compared to many chemical precipitates. Precipitated chalk far outshines the natural varieties, and fine qualities of magnesia carbonate surpass this. Microscopic examination indicates that this latter consists of particles, clear and colorless, but very minute. White lead consists of particles equally minute and also transparent, but of a yellow brown color by transmitted light; consequently, when seen in bulk it appears of a less pure white. But magnesia cannot be used as a pigment because it possesses no body; and the difference between the white lead and the magnesia in this respect depends upon the different refractive powers of the individual particles which compose the separate powders. They are both transparent in their individual particles, but the magnesia is more so. They are both bodies possessed of considerable refractive power, but the lead is more so. When air intervenes between their particles the reflective power of both so much exceeds that of air, that they are highly reflecting and very slightly transmitting; but the less absorbing power of the magnesia makes it the whitest—the more reflecting of the two. But when oil intervenes, as would be the case if they were used for pigments, the refractive power of the magnesia so nearly coincides with that of the oil, that much transmission and little reflection is the result, and this constitutes what painters call want of body. But the lead so greatly exceeds the oil in refracting power that its reflective property is not much interfered with, and even with its greater absorbing power it reflects much and transmits little light; and this is what painters call great body.

"The length of an undulation of violet light is seventeen millionths of an inch; the red undulation is twenty-six millionths; undulations longer or shorter than these not being visible. Again, the length of the light wave varies in the medium. An undulation in air measuring four will measure only two and a half when it enters glass, and will again elongate to its former measure on its exit. When an undulation passes from air into water, or into the humors of the eye it likewise becomes shortened. If we say that luminous undulations, which in air measure twenty-two millionths of an inch, look yellow when they enter the eye (that being the wave length belonging to what we call yellow light), we must also remember that they measure one-third less in that organ in consequence of its refracting power. We then come to the singular conclusion that the blue sky is yellow, sunshine is red, and the rosy tints of evening are not luminous at all till they enter the eye. If the color depends upon the length of the light wave, and the length of the wave depends upon the refracting power of the medium through which it is passing, every beam of light changes color; red it may be on passing through the region of the stars, yellow or green it may be when it enters our earth's atmosphere, blue or violet when it enters water, non-luminous as it passes through glass. But if light, which we perceive as violet while it exists in the aqueous humor of the eye, was red originally, what color must that light be which we perceive is red? Its undulations in air must be too long to be luminous at all. This introduces us to the solemn thought that all this vast universe is dark! Light only exists in the eye. It is only a sensation—a perception of that which in nature exists as a force capable of producing a sensation."

Adulterated Bread.

What with alum in the flour, and pipe-clay in the yeast, the staff of life eaten by the English must be a highly nutritious diet. The *Grocer* has the following paragraph in relation to recent discoveries in the adulteration of imported yeast:—

"Dr. Letheby informed the court of the steps taken by the authorities at Hull, and he added that, on making an analysis of six samples, of about 7,800 lbs. of the yeast, it was found that the proportion of pipe-clay in the dry yeast ranged from 28 to 36 per cent. Dr. Letheby further said it appeared that 3,733 tuns of yeast were annually imported into Hull from Schiedam, and that the total importation of yeast from Holland into the ports of Hull, London and Newcastle amounts in value, every year, to about £177,000 sterling. Most, if not the whole of the yeast, was used in the preparation of bread and confectionery. It was, therefore, of the utmost importance that the quality of the yeast should be maintained as pure as possible; for, independently of the fact that pipe-clay might of itself be hurtful to the human body, when taken for any time, the admixture of clay with the yeast hides its putrefactive changes, and so produces a very acid and unwholesome loaf. Again, as the pipe-clay contained a large proportion of alumina, which was the matter sought for by the chemist in analysing bread for alum, it was very probable that a baker using such adulterated yeast in the preparation of bread, might be exposed, under the Adulteration of Food Act, to a false charge of having adulterated his bread. The quantity of German yeast used in the fermentation of bread was about three pounds to a sack of flour; and this would give nearly half an ounce of yeast to every loaf, the pipe-clay in which was sufficient to be a cause of alarm.

Files Made by Machinery.

The manufacture of files, by machinery, as we learn from *The Ironmonger*, has been commenced in Birmingham, England. The blanks are forged by machinery, and they are then cut with the French machine of M. Bernot. The machine, which is very compact, resembles a small steam hammer in its general appearance. It is provided with a vertical slide, carrying a chisel on the lower end. The top of this slide is pressed by a flat spring, which is governed by a cam mounted upon a shaft, and actuated by a ratchet wheel and pawl; and thus the strength of the blow of the chisel is regulated to the varying breadth of the file. A projection at the other end of the slide comes in contact with a cam upon the driving shaft of the machine, and so sets the machine in motion. The blank to be cut is placed upon a traveling slide, which rests upon a semi-circular bed, which is mounted in trunnions resting upon swivelling journals, so that the surface of the blank can be presented at the desired angle to the chisel. The blank is held parallel to the edge of the chisel by means of a weighted "leveler." All being ready, the file is fixed in the bed, the machine is set in motion, and presently the file runs out cut. The chisel makes from 800 to 1,500 cuts per minute, and will produce about five or six times the amount of work which can be supplied by hand-cutting. A comparison of the two modes of cutting—hand and machinery—shows that, while a machine, to cut 14-inch hard files, makes 1,000 cuts per minute, or 600,000 cuts per day, a good file-cutter, upon the same size and description, could only make 140 cuts per minute, or 84,000 per day.

The commutation money paid by those drafted throughout the country, will amount, it is supposed, to some forty or fifty millions of dollars. The U. S. Collector at Lancaster, Pa., has received $79,000, and exempted 265 men in consequence.

The Big Gun at Charleston---What it Can Do.

The breaching power of the 10-inch 300-pounder Parrott rifled gun, now about to be used against the brick walls of Fort Sumter, will be best understood by comparing it with the ordinary 24 pounder siege gun, which was the largest gun employed for breaching fortifications during the Italian war.

A 24-pounder round shot, which starts with a velocity of 1,635 feet per second, strikes an object at the distance of 3,500 yards with a velocity of about 300 feet per second.

The 10-inch rifle 300-pound shot has an initial velocity of 1,111 feet, and has afterwards a remaining velocity of 700 feet per second at a distance of 3,500 yards.

From well-known mechanical laws, the resistance which these projectiles are capable of overcoming is equal to 33,750 pounds and 1,914,150 pounds raised one foot in a second respectively. Making allowance for the difference of the diameters of these projectiles, it will be found that their penetrating power will be as 1 to 19.6.

The penetration of the 24-pounder shot at 3,500 yards, in brick work, is 42 inches. The penetration of the 10 inch projectile will therefore be between six and seven feet into the same material.

To use a more familiar illustration—the power of the 10-inch rifle shot at the distance of 3,500 yards may be said to be equal to that of the united blows of 200 sledge hammers weighing 100 pounds each, falling from a hight of ten feet and acting upon a drill ten inches in diameter.

[The above is from the Washington *Republic*. We do not see the force of comparing the 10-inch gun with the common 24-pounder, used in the Italian war, respecting which no satisfactory information is given; whereas there is a published account of the breaching effect of rifled cannon in Captain Benton's "ordnance and gunnery." He states that Armstrong rifled guns were tried against a martello tower 30 feet in hight and 48 feet in diameter, having walls from 7 feet 3 inches to 10 feet thick, of solid brick masonry. The distance of firing from the tower was 1,032 yards. The 80 pound shot from the rifled gun passed completely through this brick masonry (7 feet 3 inches), and 100-pounder percussion shells lodged in the brick-work at a depth of 5 feet. After firing 170 projectiles, a small portion of which were shells, the entire land side of the tower was thrown down. This is positive data respecting the penetrating power of rifled guns against brick masonry; and General Gilmore, at the siege of Fort Pulaski, demonstrated in actual warfare the superior penetrating power of rifle projectiles.

The comparison of the concentrated blow of one hundred hammers, each weighing 100 pounds, falling 10 feet, and a shot of 300 pounds having a velocity of 700 feet per second, appears to be inconsistent. The expression representing the penetrating power of shot is velocity squared, multiplied by weight. The quantity of mechanical work stored up in a 300-pound shot moving with a velocity of 700 feet per second, measured in pounds lifted one foot high, is $w\ v^2 \div 2\ g$ (weight multiplied into the square of the velocity, divided by the action of gravity). Thus $300 \times 700^2 \div 64$ (action of gravity on velocity)—$= 2,296,875$ pounds lifted one foot. The velocity with which a hammer strikes after falling 10 feet is 25.28 feet per second; and the whole concentrated power of 200 sledge hammers, each weighing 100 pounds, falling from a hight of 10 feet, is equal to 200,000 pounds lifted one foot.

Photo-lithography.

A communication has been read before the Academy of Sciences, Paris, from M. Meorvan, in which he describes his method for obtaining direct photographic impressions upon stone, which he can afterwards print off. He first gives the stone a coating, applied in the dark, of a varnish composed of albumen and bi-chromate of ammonia. Upon this he lays the right side of the image to be reproduced, whether it be on glass, canvas or paper, provided it be somewhat transparent. This done, he exposes the whole to the action of light, for a space of time varying between 30 seconds and 3 minutes, if in the sun; and between 10 and 25 minutes, if in the shade. He then takes off the original image, and washes his stone, first with soap and water, and then with pure water only, and immediately after inks it with the usual inking roller. The image is already fixed, for it begins to show itself in black on a white ground. He now applies gum water, lets the stone dry, which is done in a few minutes, and the operation is complete; copies may at once be struck off by the common lithographic process. The varnish has been fixed and rendered insoluble by the action of light wherever it could penetrate; but all the parts of the varnish protected by the dark portions of the image still retain their solubility, and are removed by the soap.

Proper Time and Mode for Cutting Flowers.

The Irish Country Gentleman's Journal says:—"Those who wish to retain the beauty and perfume of their cut flowers would do well to take the following advice:—Never cut your flowers during the intense sunshine, nor keep them exposed to the sun or wind; do not collect them in large bundles, nor tie them tightly together, as this hastens their decay. Do not pull them, but cut them cleanly off the plant with a sharp knife, not with a pair of scissors. When taken indoors, place them in the shade, and reduce them to the required length of stock with a sharp knife, by which means the tubes through which they draw up the water are left open, and the water is permitted to ascend freely, whereas if the stems are bruised or lacerated, these pores are closed up. Use pure water to set them in, or pure white sand in a state of saturation, sticking the ends of the stalks in it, but not in a crowded manner. If in water alone, it ought to be changed daily, and a thin slice should be cut off the ends of the stalks at every change of water. Water about milk-warm, or containing a small quantity of camphor dissolved in spirits of wine, will often revive flowers that have begun to fade. Place a glass shade over them during the night, or indeed at all such times as they are not purposely exhibited. Shade them from very bright sunshine, and when uncovered, set them where they may not be exposed to a draught of air. A cool temperature during the summer is favorable for them, and the removal of the slightest symptoms of decay is necessary. When carried to a distance, carry them in a shallow air-tight tin case, or cover them with paper to exclude them from air and light. Charcoal saturated with water is also a good media to stick them in, and the thinner they are kept the better."

Economy in a Family.

There is nothing which goes so far toward placing young people beyond the reach of poverty as economy in the management of household affairs. It matters not whether a man furnishes little or much for his family, if there is a continual leakage in his kitchen or parlor; it runs away he knows not how, and that demon Waste cries, More! like the horse-leech's daughter, until he that provided has no more to give. It is the husband's duty to bring into the house; and it is the duty of the wife to see that none goes wrongfully out of it. A man gets a wife to look after his affairs, and to assist him in his journey through life; to educate and prepare their children for a proper station in life, and not to dissipate his property. The husband's interest should be the wife's care, and her greatest ambition to carry her no farther than his welfare or happiness, together with that of her children! This should be her sole aim, and the theater of her exploits in the bosom of her family, where she may do as much towards making a fortune as he can in the counting-room or the workshop.

It is not the money earned that makes a man wealthy—it is what he saves from his earnings. Self-gratification in dress, or indulgence in appetite, or more company than his purse can well entertain, are equally pernicious. The first adds vanity to extravagance; the second fastens a doctor's bill to a long butcher's account; and the latter brings intemperance—the worst of all evils—in its train.

Cultivation of Cabbage.

This valuable esculent may be brought to table in good condition nearly the whole of the year round, by planting from a series of monthly sowings, extending from early in March to the end of August. The largest sowing, however, requires to be made on or about the 12th July, from which the spring supply is produced; those which are sown previous to that date form heads the same year, and produce a succession of nice young cabbages far on into the winter. The August sowing is to furnish plants to be pricked into a nursery bed and planted in a bed in March, to succeed the autumn planted bed, which should be rooted up as soon as the produce is cut. In this manner, by making small beds at proper intervals, removing the old beds as soon as the first produce is cut, and cropping the ground with a different vegetable, the fertility of the ground is retained. The whole family are terrible suckers of the soil, and hence arises the necessity for affording them, a liberal supply of manure strength.

Cabbages like a strong soil, which, when prepared for planting, should be well manured and deeply trenched; and to ensure a free growth and consequent succulent tender quality during the hot months, they should be roughly hoed up, and liberal supplies of liquid manure poured over them; in the cooler months of the year this will not be necessary, provided there is plenty of stimulation from beneath. Very light and sandy soil will require even more attention to be paid to the manuring part of the question than strong soil, and will not produce tender fine-flavored cabbages without a good supply, and many applications in a liquid state.

About Ginger.

This is the root, or rather the underground stem, of a plant which is a native of the East Indies; but is now grown in many other tropical countries. The stem grows two or three feet high, and is reed-like; the flowers are borne on a separate stalk, of a dark purple color, and appear from between broad scales. Our supply comes from both the East and West Indies; and is imported in the root, which differs much in appearance and quality. When scalded as soon as it is taken up, and dried in the sun, it has a dark brownish color; but if the root is scraped before it is dried, it is much lighter in appearance. Some of the finer kinds are not only scraped but bleached, and are known as white ginger. The root is retailed in powder, and in the grinding is frequently adulterated with meal and similar substances; several grades of ginger being kept at the wholesale stores at prices corresponding to the amount of adulteration. The preserved ginger, which is brought in jars from China, is prepared from the young and tender roots, before they have become stringy, or have acquired a very powerful pungency. The fresh root is imported from the West Indies, and is frequently sold in cities for the purpose of flavoring citron, melon, and other preserves. These fresh roots, which are usually brought in the Fall, may be planted in a pot and kept through the Winter, and in the Summer turned out into a warm place in the garden, where they will flourish during hot weather.

MACAROONS.—These little cakes are much admired, and are a very agreeable addition to the dessert. The following is a receipt for preparing them:—"To a quarter of a pound of sweet almonds, take four tea spoonsfull of orange-flower water, the whites of six eggs, and one pound of sifted white sugar. Blanch the almonds (remove the brown skin), and pound them with the orange flower water, or some of the white of an egg; then whisk the whites of the eggs and add them gently to the almonds. It is important that these two ingredients should be carefully added, or they will 'oil' or separate. Sift the sugar into the mixture until the whole forms a paste, not too stiff to drop upon white paper, which should be placed in a tin, or on a plate, and the whole baked in a slow oven till done.

REMEDY FOR SMALLPOX.—The Surgeon-Major of the Royal Horse Guards writes to the London *Times*, that the root of the pitcher plant is a specific for this disease. An ounce of the root is sliced, infused in a quart of water, allowed to simmer down to a pint, and given in two table spoonsfull doses every four hours, while the patient is well nourished with beef tea and arrowroot.

FREAK OF LIGHTNING.—The factory of Keith and Packard, in North Bridgewater, Mass., was lately struck, but no material damage done. A workman, who was carrying a bar of iron on his shoulder, was prostrated and his overalls torn to shreds, yet he received no personal injury.