

**OSTRICH FARMING IN SOUTH AFRICA.**

We present a series of illustrations, taken from the *Illustrated London News*, of this new and profitable industry in South Africa. They are from photographs taken on the estate of Mr. A. Douglass, near Grahamstown, who was the originator of ostrich farming, and is the largest ostrich proprietor. Ten years ago Mr. Douglass obtained three wild birds, and afterwards eight more. As soon as he found they would lay in confinement, he began his experiments in artificial hatching. This attempt met with but little success for three years, till he invented the patent incubator, the success

of which has become renowned. By its means he has increased the eleven birds to 900, and these and others, becoming dispersed throughout the colony, have made ostrich farming, next to wool and diamonds, the most important industry of South Africa.

Mr. Anthony Trollope's recently published book on "South Africa" contains the following description: "Mr. Douglass is, among the ostrich farmers of the colony, about the most successful, and the first who did the work on a large scale. He is the patentee for an egg-hatching machine or incubator, which is now in use among many of the feather growers of the district. Mr. Douglass occupies about 1,200 acres of

ous bushes and grasses of the land. The farms divided out into paddocks, and, with those which are breeding, one cock with two hens occupies each paddock. The young birds—for they do not breed till they are three years old—or those which are not paired, run in flocks of thirty or forty each.

"Ostrich farming without the use of an incubator can never produce great results. The birds injure their feathers by sitting, and at every hatching lose two months. There is, too, great uncertainty as to the number of young birds which will be produced, and much danger as to the fate of the young bird when hatched.

according to circumstances, or the yolk becomes glue and the young bird is choked. Nature has to be followed most minutely, and must be observed and understood before it can be followed. And when the time for birth comes on, the ostrich farmer must turn midwife and delicately assist the young one to open its shell, having certain instruments for the purpose. And when he has performed his obstetrical operations he must become a nursing mother to the young progeny, who can by no means walk about and get his living in his earliest days. The little chickens in our farmyards seem to take the world very easily; but they have their

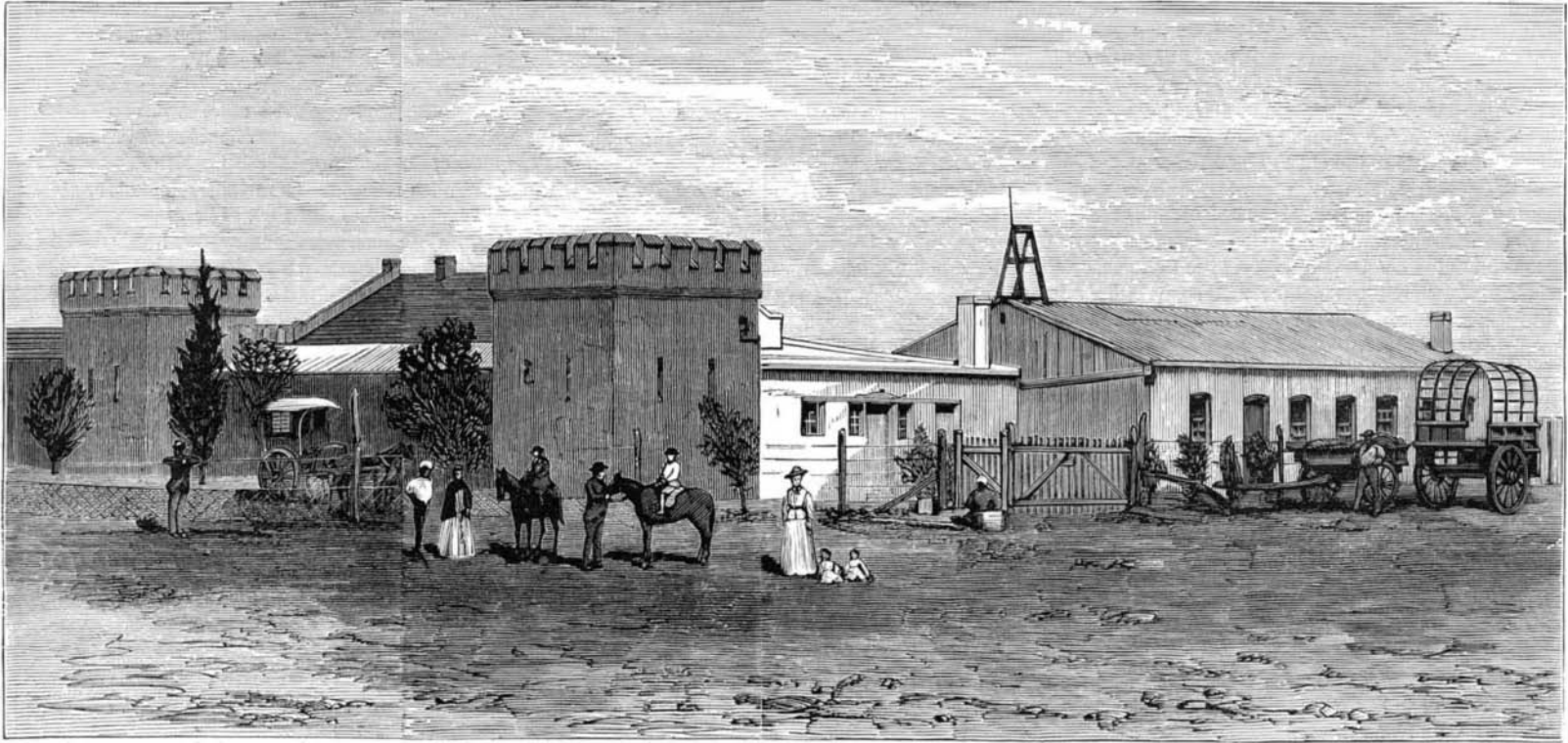


Fig. 1.—HEATHERTON TOWERS, NEAR GRAHAMSTOWN.

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"The incubator is a low, ugly piece of deal furniture, standing on four legs, perhaps eight or nine feet long. At each end there are two drawers, in which the eggs are laid with a certain apparatus of flannel; and these drawers, by means of screws beneath them, are raised and lowered to the extent of two or three inches. The drawer is lowered when it is pulled out, and is capable of receiving a certain number of eggs; I saw, I think, fifteen in one. Over the drawers and along the top of the whole machine there is a tank filled with hot water, and the drawer, when closed, is screwed up so as to bring the side of the egg in contact with the bottom of the tank. Hence comes the necessary warmth. Below the machine

mother's wings, and we as yet hardly know all the assistance which is thus given to them. But the ostrich farmer must know enough to keep his young ones alive, or he will soon be ruined; for each bird when hatched is supposed to be worth £10. The ostrich farmer must take upon himself all the functions of the ostrich mother, and must know all that instinct has taught her, or he will hardly be successful.

"The birds are plucked before they are a year old, and I think that no one as yet knows the limit of age to which they will live and be plucked. I saw birds which had been plucked for sixteen years, and were still in high feather. When the plucking time has come, the necessary number of

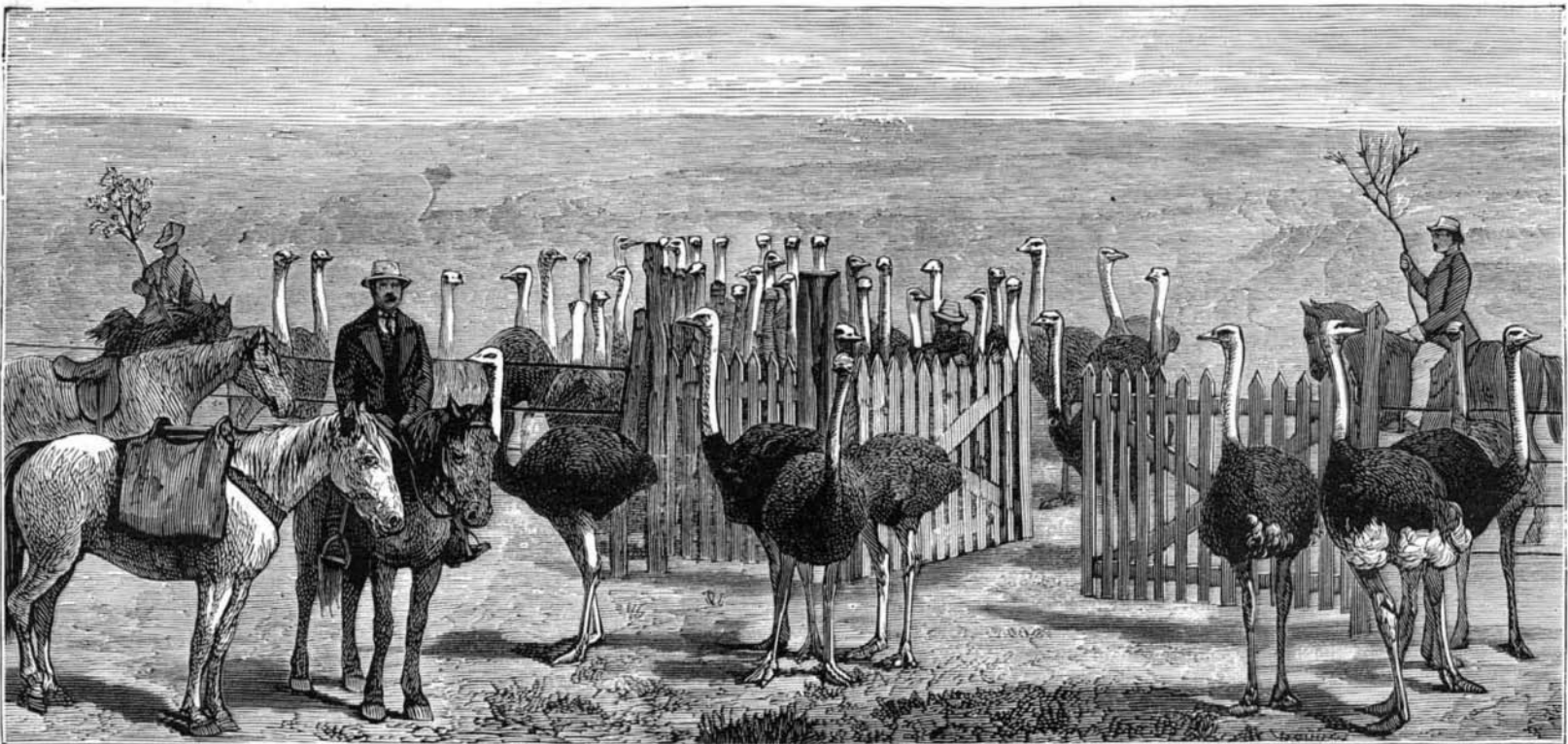


Fig. 2.—BIRDS MUSTERING.

rough ground, formerly devoted to sheep farming. The country around was all used not long since as sheep walks, but seems to have so much deteriorated by changes in the grasses as to be no longer profitable for that purpose. But it will feed ostriches.

"At this establishment I found about 300 of those birds, which, taking them all round, young and old, were worth about £30 apiece. Each bird fit for plucking gives two crops of feathers a year, and produces on the average feathers to the value of £15 per annum. The creatures feed themselves, unless when sick or young, and live upon the vari-

and in the center of it a lamp or lamps are placed, which maintain the heat that is required. The eggs lie in the drawer for six weeks, and then the bird is brought out.

"All this is simple enough, and yet the work of hatching is most complicated, and requires not only care, but a capacity of tracing results which is not given to all men. The ostrich turns her egg frequently, so that each side of it may receive due attention. The ostrich farmer must therefore turn his eggs. This he does about three times a day. A certain amount of moisture is required, as in nature moisture exudes from the sitting bird. The heat must be moderated

birds are enticed by a liberal display of mealies—as maize or Indian corn is called in South Africa—into a pen, one side of which is movable. The birds will go willingly after mealies, and will run about their paddocks after any one they see, in the expectation of these delicacies. When the pen is full, the movable side is run in, so that the birds are compressed together beyond the power of violent struggling. They cannot spread their wings, or make the dart forward which is customary to them when about to kick. Then men go in among them, and, taking up their wings, pluck or cut their feathers. Both processes are common, but the former, I



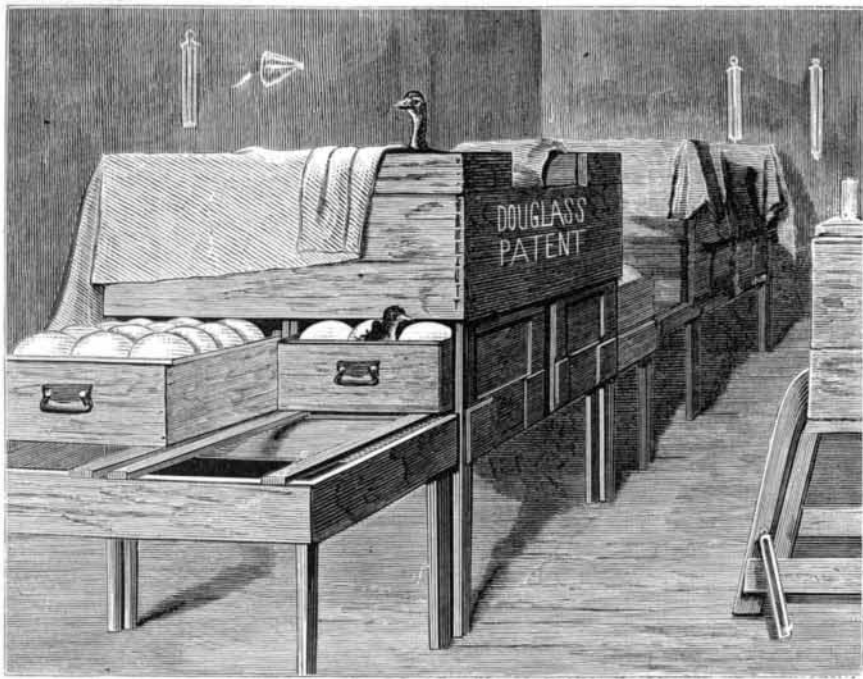


Fig. 3.—THE INCUBATING ROOM.

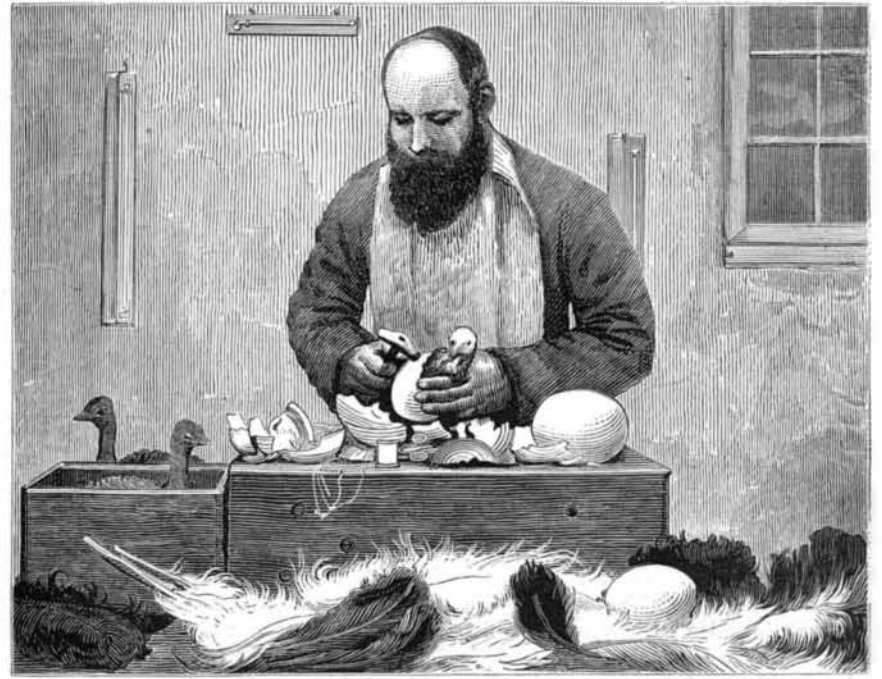


Fig. 4.—HELPING OUT A WEAK ONE.

think, is most so, as being the more profitable. There is a heavier weight to sell when the feather is plucked; and the quill begins to grow again at once, whereas the process is delayed when nature is called upon to eject the stump. I did not see the thing done, but I was assured that the little notice taken by the animal of the operation may be accepted as proof that the pain, if any, is slight.

Fig. 1 is a view of Heatherton Towers, the residence of Mr. A. Douglass, in the Fish River Valley, eighteen miles from Grahamstown.

Fig. 2 is the scene of mustering the birds, which run in flocks in large inclosures. The one where our view is taken is 3,000 acres, with a troop of 240 birds in it. Here, once a week, they are all hunted up by men on horseback, armed

egg can be seen just broken through. On the top of the machines are the birds' sleeping places, all heated. The drawers are represented as when lowered and drawn out, to show them; when again pushed in, they are lifted and fastened by large screws beneath them.

In Fig. 4, Mr. Douglass is represented in the act of helping a weakly bird out of its shell. By certain signs discov-



Fig. 5.—THE FEATHER ROOM.



Fig. 6.—COOLY WITH YOUNG BIRDS.

“The feathers are then sorted into various lots; the white primary outside rim from under the bird's wing being by far the most valuable—being sold at a price as high as £25 a pound. The sorting does not seem to be a difficult operation, and is done by colored men. The produce is then packed in boxes, and sent down to be sold at Port Elizabeth by auction.”

with large boughs of thorn, to keep the birds off, as many are very savage, and their kick is dangerous. One man will be observed in front, with a pack horse, loaded with Indian corn, to lead them.

The incubating room is shown in Fig. 3. It is a large building so constructed as not to be affected by change of weather. Here several incubators are at work; in one an

ered by himself it can be told to an hour when the bird is ready; but it often happens that the bird cannot pierce the shell, and unless helped would die.

Fig. 5 is the interior of the feather room. We are informed that the birds are plucked twice a year; that is, the tail and the primary wing feathers, which are the only white feathers, are plucked, and the secondary wing feathers, which

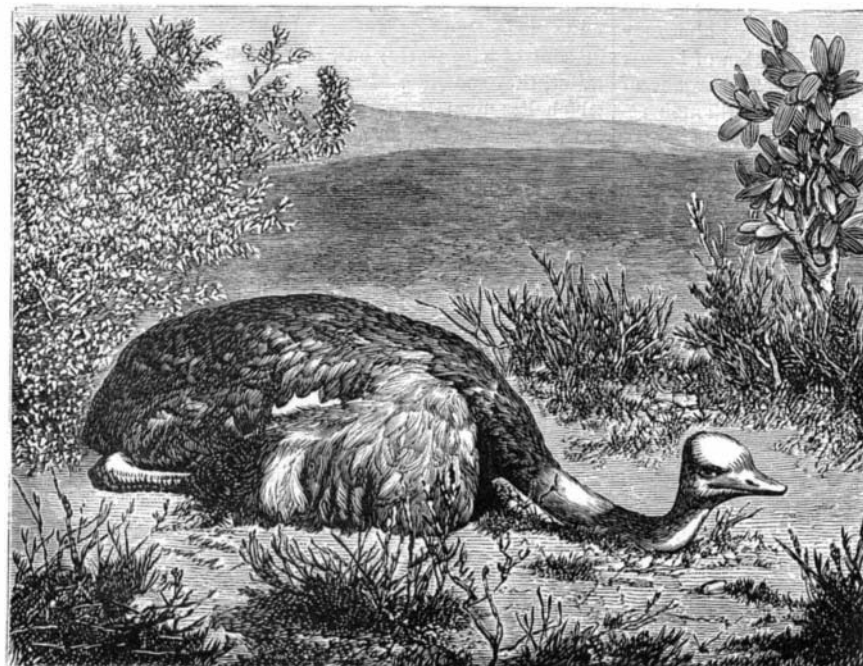


Fig. 7.—A BIRD SITTING.

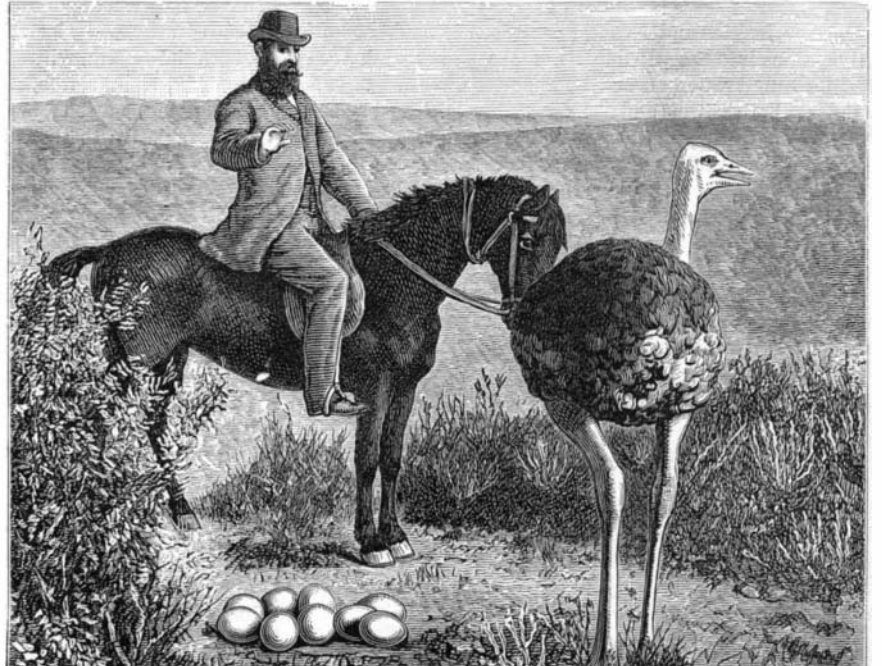


Fig. 8.—FINDING A NEST.



are the long black feathers. These are all that are taken from the bird. In this room the feathers are sorted into various qualities, tied up in bunches, and packed in cases ready for shipment to London.

Fig. 6 shows a coolie with his lot of young birds. It should be explained that to each lot of about thirty birds a man is told off, who from sunrise to sunset goes about in the lucerne fields with them, cutting up the lucerne for them, or breaking bones for them, and finding them gravel and water. They become immensely attached to their nurse.

Fig. 7 shows a bird sitting on her nest. The hen sits by day and the cock by night, except in wet weather, when the cock will remain on day and night, being evidently afraid to trust his wife.

Fig. 8 represents "a find." It is often a serious matter to find the nests; the bird is in anger at being disturbed, and, if a male bird, would soon send horse and rider flying to escape his furious kicks.

#### THE PREMIER TRICYCLE.

The tricycle illustrated on this page is an English machine, made by Hillman & Herbert, of Coventry. The engraving we copy from *Iron*. The framework is a horizontal bar, bent into a rectangle, with a double-throw crank axle running in anti-friction roller bearings, which are bolted to the frame. Two large wheels, from 46 to 50 inches in diameter, are mounted upon this axle, one of them being the driver. Three C-springs are also bolted to the frames, to support the seat, and two rods, extending downward, carry a steel bar, whereon the pedal levers are pivoted. A stout tube connection for the guiding wheel is also bolted to the framework, and is curved so as to be out of the way of the feet and legs, and render the machine suitable for ladies as well as gentlemen. The guiding wheel is 22 inches in diameter, and runs upon an adjustable double-coned pin in an upright fork, about 4 feet in advance of the crank axle, and exactly midway between the large wheels. Its handle is very conveniently pivoted, so that it may be turned over or reversed, and used to draw the machine when necessary, as in the case of steep hills. The wheels are all tired with Para rubber, and their fellies are of U-shaped steel, while a powerful roller brake is attached to the driving wheel, the lever being at the right hand of the rider.

The steel bar carrying the propelling levers is placed as near the ground as safety permits. It is strengthened by a couple of steel rods projecting under the pedal levers in such wise that the double purpose is served of imparting perfect rigidity to the bar, and supplying a guard or stop in case of the pedal levers and crank becoming broken or unhinged. Without such a guard, serious accidents might occur, in spite of the best workmanship and materials, by the pedal dropping and catching the ground while the machine is in progress. The pedals are rubber-cushioned, and the connections are adjustable to suit length of leg. A step is fixed on the right side for mounting and dismounting, while the back of the seat is arranged to carry any amount of luggage.

#### Reversed Speech.

Messrs. Jenkins and Ewing have recently made some investigations into the capabilities of the phonograph for reversing sound when turned in opposite directions. They state that both vowels and consonants are unaltered by being spoken backwards; and that, whether the pulsations of air be made in a given order or in the reverse order, the ear accepts the sound as indicating the same letter. Consonants between single pairs of syllables, as *ada, aba*, etc., are identifiable quite as well backwards as forwards. *Ab*, however, said backwards becomes *ba*, and thus the investigators suggest we have here a standard of what does really constitute a single letter or element of articulate speech: it is any one reversible part. The word *noshaeososa* pronounced in the phonograph is reproduced very clearly as *association*.

#### A New Grain Elevator in New York.

The New York Central and Hudson River Railroad Company are about to construct another grain elevator in close proximity to that at 60th street and North river in this city, illustrations of which we published about a year ago. The new building will have a capacity of about 800,000 bushels of grain, and is to embody all the latest improvements in elevator construction.

#### Contagion by Mail.

The London *Telegraph* has recently published a correspondent's letter setting forth a remarkable instance of scarlet

fever being communicated by a letter. A lady wrote to a friend to inform her that she was nursing her daughter, suffering from scarlatina. The friend, after reading and burning the letter, gave the envelope in which it was contained to one of her children to play with. Shortly after, the child became sick of the same disease, which the physician traced to his own satisfaction to the infected letter. It might be suggested that an examination into the prevalence of contagious maladies among post office employés would throw some light on the danger of a possibly infected mail. One letter capable of communicating scarlet fever or small pox would probably render every other missive in the same pouch equally dangerous as a disseminator of disease. At any rate it is on the safe side to send no communications from infected houses save those that are absolutely necessary, and these should be immediately burned.

#### PLANT MIND.

V.

#### VEGETABLE ANATOMY.

Exquisite sensibility to all the powerful agents of Nature, heat, light, cold, moisture, drought, favorable and unfavorable surroundings, and even kind or unkind treatment, ever responsive to loving care, and drooping under chill neglect, are undeniable characteristics of plant life; and in so delicate an organization need we be surprised to find a complete analogue to the anatomical structure of animal and animated beings?

Among the ancients we find a continual recognition of the male and female, or principle of distinctive sexes, in vegetable creations; and Pliny taught that "in all trees and plants, nay, rather, in all things that proceed out of the earth, even in the very herbs, there are both sexes;" while the catalogues of the sixteenth century invariably recognize this distinction. In the "Philosophia Botanica," the parts of a flower are described by Linnæus in strictly anatomical terms, while the botanical text-books of the present day admit the fact as no longer to be questioned.

Has there been convincing proof of the existence of a cor-

time the bark of a separated branch, and the albumen or sap wood may be kept in the same manner.

By careful observation and experiment, an arterial system may also be detected. These experiments are usually made with the aid of colored decoctions upon plants which have a white blood or circulating medium. Their structure is in the form of a spiral line, but not interrupted by valves; at least the valves, we believe, have not yet been discerned. The vermicular motion of the spiral has been conjectured to be the equivalent for the action of the valves in the arterial system of animal beings, as each spiral ring pushes forward its contents by means of contraction, and, with a retrograde movement of the absorbent vessels, conveys moisture downwards as well as upwards. The sap is very generally admitted to be true vegetable blood, or to be to the vegetable just what blood is to our animal economy.

In addition to this system of absorbent vessels is also to be found a systematic apparatus for the purpose of exposing to the action of the atmosphere the fluids absorbed by the lacteals and lymphatics. This may be considered as an equivalent for the pulmonary system in animal life or in human organization. This is to be found in the leaves and in the petals of flowers. Above ground, or in the atmosphere, it answers to the lungs in animals, and in sub-aquatic or marine plants, to the gills in fishes. The fluids absorbed from the earth or atmosphere are carried to the foot stalk of every leaf, while the absorbent vessels of each leaf unite into branches and form pulmonary arteries, which are dispersed to the extremities of each leaf. In the leaf we behold the pleasing object of a complete circulation, with a pulmonary vein receiving the blood from each artery on the upper side of the leaf; while again, uniting in the foot stalk of the leaf, these veins form aortas, dispersing new blood over the new bark, elongating its vessels, or producing new secretions. The vessels in the intertexture of the bark are so minute that the venous system cannot be fully investigated without the aid of more powerful microscopes than we now have; but reason is always in advance of experiment, and we do not attempt to invent; we only try to discover facts.

As the corols or petals act as lungs to the flower or fruit, as it is called in botanical language, much of the process may be seen by the naked eye, for in these organs the vegetable blood is brought into contact with air and light. These vessels are all extremely sensitive to the stimulus of fluids received, and propel them upwards with great force. This susceptibility to irritation from juices absorbed, with their increased activity in the warmth of spring, proves the immediate presence of a vital force, and resembles in the minutest particular the action of similar vessels in animals.

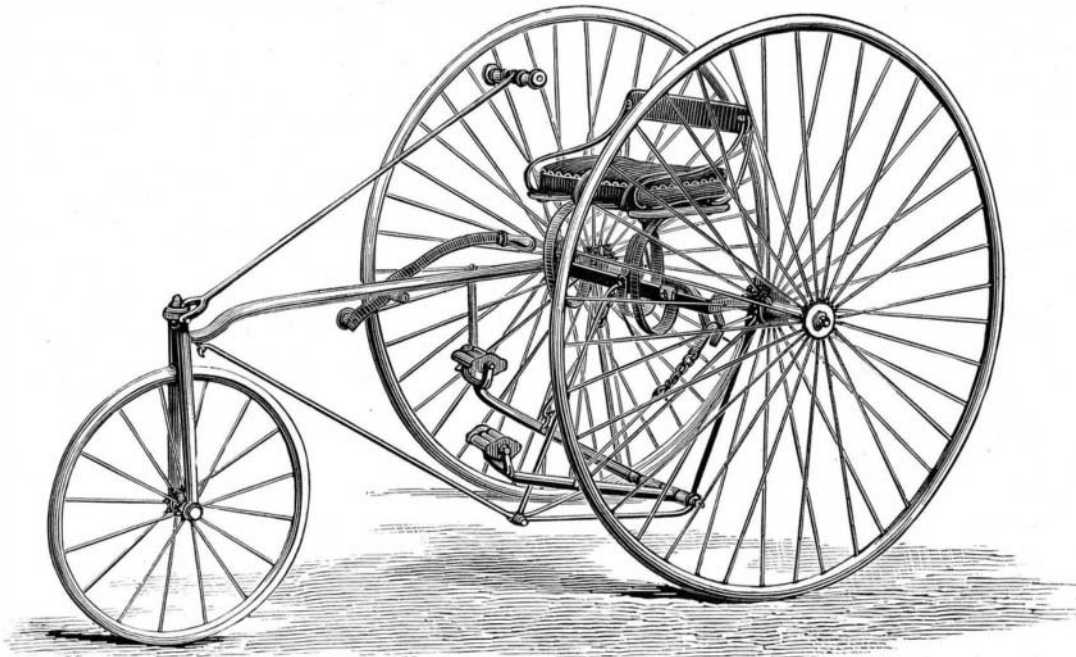
In the "Veget. Stat." of Dr. Hales, the above statements are verified by experiments, which may be easily repeated.

Indeed, the analogy between the breathing apparatus of animals and the leaves of plants is so complete that it may be accepted as an undisputed fact in regard to the organic

life of plants. A thin pellicle or membrane protects while exposing the vegetable blood to the action of the atmosphere, upon the upper surfaces of leaves, or organs of respiration. (*Vide Bonnet, "Usage des Feuilles."*) Leaves continue green many days when placed with the *under* surface in contact with water; but, if with the *upper* side next the water, they soon die. In aquatic plants it is the *under* side which lies upon the water, but the *upper* which is exposed to the action of the air and light. That leaves act the part of lungs, or giving out a phlogistic material to the atmosphere and inhaling oxygen or vital air, is no longer a subject of dispute among the learned.

Aquatic plants afford very marked illustrations of the above assertions. The lower leaves of the *Trapa* being beneath the water are divided into minute capillary ramifications, either getting from or giving to the water the indispensable oxygen, thus answering in their office to the gills in fish. The upper leaves of the *Trapa* are broad and round, with air bladders in their foot stalks, by which they are supported above the surface of the water. These upper leaves are undivided, while they are found below the water cut into fine divisions. These minute subdivisions of sub-aquatic plants may also facilitate the separation of the air by their points or edges. The contained air finds at the point of each fiber a place where the resistance to its expansion is less, and it there expands and becomes a bubble of air.

On very high mountains, where the atmosphere is of great rarity or thinness, the reverse arrangement has been noted, the upper in place of the lower leaves being finely divided, and thus affording a larger surface of contact necessary for the welfare of the plant individual. R. C. K.



THE PREMIER TRICYCLE.

respondent collection of parts, which constitute not resemblances alone, but parity of functions? Replies are made in the affirmative by those who are familiar with the revelations of the modern microscope. There are a complete system of absorbent vessels, lacteals, and lymphatics; a pulmonary and arterial system, with glands for the separation of honey, gum, wax, resin, starch, sugar, essential oil, etc.; organs of reproduction, muscles, and, we think, *nerves*, although researches relative to the existence of nerves in plants are yet in their infancy, and may be guessed at rather as exhibited in action than actually seen in their minute reality. As the magnifying powers of the microscope have not yet reached their ultimatum, neither have explorations yielded all their secrets.

There are three systems of absorbent vessels in plants, namely, lymphatics, lacteals, and placental vessels for the nourishment of the embryo. The vessels which in plants correspond to the lacteals in animal beings are those which imbibe nutriment from the earth in the form of moisture; these are abundant in the roots, they flourish when supplied with water, and die when it is wanting.

The openings of the lymphatic vessels are to be found on the external surfaces of the bark and leaves, on the internal surfaces of all the cells, and between the bark and albumen or sap wood. By Grew and Malpighi, these were supposed to be air vessels, but later observers have decided that conclusion to be erroneous. The absorbent vessels on the under side of a leaf prevent speedy death when laid upon the surface of a vessel of water, while a leaf placed with its upper side next the water will speedily decay or dry away. Moisture imbibed through these vessels will keep alive for some