

## Vegetable and Animal Development.

There is rarely as beautiful a prose composition, and certainly very seldom a more concise presentation of modern science than that seen in the following, from the pen of Prof. J. W. Hoyt:—

Considered as a kingdom by itself, how full of beauty and wonder is the great vegetable world. Created first, and exerting its purifying influence on the poisonous atmosphere of the renewed earth for ages before the advent of man, it has ever been a mediator between him and the otherwise unavailable forms of inorganic matter. For untold centuries the needed organic elements had been weltering in chaos, but there was no power of the vital forces competent to mold them into human form. God had decreed a slow and gradual development, by means of successive steps, as well for organizable atoms, as for geological strata and the grander groupings of worlds into systems. And so, after the renewing energy of Omnipotence had dissolved the thick veil of darkness that enveloped the earth, and brought to bear the vivifying sunlight of heaven, and the softer radiance of kindred spheres; after the "waters under the heavens" had been "gathered together into one place," and the dry land made to appear, His voice was heard again, saying, "Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind."

Then was there a new joy among the atoms of the earth and air. Vitality was come! and the lifeless clod might feel the subtle flow of nature's quickening forces, become a living thing, and in the golden future minister to the greater needs and higher pleasures of the god-like man that was to be—the noxious vapors of the air might now become the sweet nectar of glowing fruits and the spiritualized fragrance of ambrosial flowers. Even the ruby and diamond were glad, choosing rather to live in the flower of the blue bell, or e'en in fields of waving wheat and rustling corn, than, bound by geometric law severe, remain a lifeless jewel!

And so, as the new year revolved, countless germs unfolded, and the earth was clothed with beautiful verdure. Added years produced their giant growth of forests, such as we shall never see, and to-day the same wonderful transmutations continue. From the tall, slender palm, waving its coronal of luxuriant leaves in the refreshing breezes, far above the hot vapors of the tropical forests, to the simple moss, that clothes the stony wall of the damp grotto with its velvet verdure; from the magnificent pine of California, that sublimely lifts its brawny arms three hundred feet above the earth, to the microscopic plant that covers our window pane with iridescent hues; from the splendid Victoria Regia that cradles its rosy petals in the deep quiet waters of Guiana, to the modest violet growing on the hillside—what a wonderful "play of fashioning," what "wealth of forms!"

From the old Baobab, the concentric rings of whose trunk have tallied six thousand years, the beginning of whose growth may have been prior to the advent of man upon the earth, to the undefined fungus, whose existence is begun and ended in a single summer's night, what differences of duration, consistence and texture. And yet they all have a single type and common origin, beginning every one with a simple little cell, to the unaided eye invisible.

While, therefore, these circumstances very greatly add to the interest of the subject, the identity of all, in the generalities of organization, immensely reduces the labor of study requisite to a knowledge of their physical constitution, and the physiological laws involved in their growth. Indeed, this identity is not confined to the individual plants in their relation to each other, but really, to a surprising extent, is demonstrable as existing between plants and animals, so that, minutely examined, science is utterly unable to distinguish between them; and even when viewed less closely, the resemblance is so remarkable as to render it exceedingly difficult to establish distinct lines of demarcation.

Doubtless, as Dr. Gray remarks, this uncertainty is attributable to our imperfection of knowledge, rather than to any confusion of the characteristics of the two kingdoms.

In the infancy of natural history, the power of locomotion and the presence of a stomach, were supposed to characterize the animal; but it is now known that sponges, and other allied classes of animals, are deficient of both, while some plants, as the Fuci, possess a certain kind of locomotive power, and others add a sort of stomach.

Again, in more recent times, some thought to have discovered a means of determining their distinctive character by assigning nitrogen to the animal, and denying it to the vegetable. Modern discoveries, however, have demonstrated that nitrogenized matter is essential to the growing parts of plants, so that this circumstance fails us also. Nor is sensation a distinguishing characteristic, since the "sensitive plant," and some others, are superior in their sensibility to numbers of recognized animals.

Microscopically examined, in their secondary stages of development, a difference is said to be discoverable in primary structure, the cell proper of the plant remaining well defined throughout, while in the animal every trace of the original cell will have disappeared. Still, in the earlier stages, such possibility is quite out of the question.

Finally, there are no distinctions palpable to the senses, no distinguishing physical differences—only physiological or physio-chemical, and upon these we are forced to rely. The plant feeds on inorganic matter, the animal solely on organic; the plant inhales carbonic acid gas, and decomposes it, appropriating the carbon and rejecting the oxygen; the animal re-composes carbonic acid, and exhales it, so that what is food for the one is poison to the other. These are the chief points of difference between them.

## American Readers in England.

From the London *Times'* report of the exhibition of the Royal Agricultural Society, which took place at Salisbury, Eng., on the 17th of July, it appears that J. E. Heath's reaper and mower, patented through our agency, and published on page 120 of volume 11, SCIENTIFIC AMERICAN, gained the first prize. The invention was assigned to Henderson & Caryl, of Sandusky, O., who patented it in England, and it is one of the now multiplying examples wherein the exportation of American inventions previously secured by patents abroad has resulted in considerable advantage to their proprietors. The following extract from the *Times*, shows how the machine is viewed by that great exponent of public opinion:—

"The trial of reapers took place upon a field of ripe rye, near the show-yard, the style and expedition of the work assuring the light-land farmer that he need not suffer a single acre of corn to shake unripe for lack of harvest men, (as was extensively the case last year) and affording promise to the grower of heavy and storm-broken crops that he may yet hope to possess a machine able to shear without wasting, and to save both expense and the more momentous matter of time in his laborious harvesting. Undoubtedly, the greatest novelty in this department, and one of the most meritorious and valuable pieces of machinery in the whole show, is the "Eagle" combined reaper and mower, invented by A. H. Caryl, of Sandusky, Ohio, U. S., and exhibited by H. Clayton, of the Atlas Works, Dorset-square, London. In this machine we see just the simplicity of parts and consequent lightness, the small liability to derangement in working, and yet the greatest facility of accommodation to uneven surfaces of ground and irregular and tangled cropping, which recommend it as emphatically a tool for the farmer. The framing, of the most compact description, is carried by bearings upon the axle of the main carriage wheel on the near side of the machine, the horses yoked to a pole preceding it, while the driver is mounted on the seat behind. By this arrangement, and by the adjustment of the line of draft, the weight is balanced, and the driver can elevate the front or cutting edge eight or ten inches—so as to clear any obstacle, or cross a furrow—by simply depressing the hind part with his foot. The objectionable side draft or thrust of most machines is in a great measure obviated by the fixing of the off-side small car-

riage wheel somewhat more forward than, instead of abreast of the main wheel. The cutters are simple in form and construction, yet very effective. They are acute, somewhat like Hussey's, but sliding to and fro above the projecting "fingers," which are also sharp, and thus form shears or scissors. A spring bar presses the knives firmly in their places, and prevents all clogging, and the vibrating motion of the cutter bar is much slower than in other machines. In place of the spur wheels and pinions so multiplied and complex in most of our reapers, there is here a neat arrangement of cams and slides, and not a single cogged wheel to be found. It operates beautifully as a mowing machine for grass or other crops; and when employed to reap white corn, a curved platform is attached, on which a very ingenious yet simply-constructed automatic rake collects and delivers the corn in sheaf bundles in the rear of the machine, out of the way of the next course. This machine received the £200 prize in Massachusetts, after a three days' trial, in 1856. As a mower, it has gained the first prize in Salisbury. Messrs. Burgess & Key's reaper, with the screw platform, and also an addition in the form of a revolving conical roller, wrapped with a screw in place of the old dividing-iron, to lay the up-standing corn upon the machine, has been rewarded; as also Crosskill's Bell and Lord Kinnaird's. Dray's Hussey, with the tipping platform, which has generally been a favorite, and considered as the rival of Burgess & Key's, has been distinguished only with a commendation, the judges being resolved to patronize the principle of a self-acting delivery."

## The Chinese Sugar Cane.

Great quantities of this species of the sugar cane have been planted, and under the influence of the recent growing weather, the cane is rapidly advancing towards maturity. The question whether the product is crystallizable still remains open—a fact which seems strongly to argue that it is not practically, as were it otherwise, some of the sugar would have been exhibited in a dry state long ere this. A sugar-refining house in Philadelphia lately examined a sample of the syrup, but in their report, which is published as favorable to the claims of the *Sorgho*, they say that their investigation has been but qualitative, and merely to ascertain whether there was any crystallizable sugar contained therein. To this purpose they subjected it to the low power of a microscope, which revealed regularly formed rhombohædric crystals of cane sugar. This leaves us still nearly as much in the dark as ever.

## Old Ironsides.

The frigate *Constitution* was at Portsmouth last week, where she is to be taken into the dry dock at the Navy Yard. This favorite frigate has been now so extensively repaired at different times that very little remains of her original wood; but the individuality of the ship remains, and the memory of her victories awakens some of the proudest feelings connected with our navy.

## Cod Fishing on the Pacific.

An Oregon or rather a Washington Territory paper claims that the inlet at the extreme north of our Pacific coast, known as Puget's Sound and Fuca's Straits, abounds in cod fish, and that with the same capital invested, cod fishing might be prosecuted as successfully there as at the most favored points on the Atlantic coast.

## Quick Passage.

According to the *Hamilton Banner* the *Indian*, on a late homeward voyage, made the trip from Quebec to Liverpool in nine days and eleven hours. This is one of the quickest trips on record, and only excelled as yet by the *Persia's* trip, which we recorded a week or two since.

## The Hay Crop.

In this section the crop of grass, always one of the most important to all classes, is very liberal, but the weather for curing it has been peculiarly unfortunate. The country is full of hay, but a great part of it is more or less damaged by exposure to bad weather.

## Pearl Muscles.

MESSRS. EDITORS.—Some time since I noticed in your paper a communication from a correspondent, stating that our western streams abounded with the shell fish in which pearls were found, and being near the creek in this place, I had the curiosity to make an examination. I found plenty of the muscles, but there was a most deplorable scarcity of any kind of valuables. I find there are two kinds of muscle. The most numerous are from three to five inches in diameter, with a thick shell, the outside of a rough and dark brown appearance, the inside a changeable purple, having all the appearance in reality of the mother of pearl; the flesh looked like that of the oyster, and on being torn open discharged a quantity of white milky substance. The other kind are about four inches long and two inches wide, with dark green stripes running from the hinge to the edge, the surface is smooth and polished, and looks as if it had been varnished; the shell is thin and almost transparent, so much so that you can with little difficulty read through it; the flesh is about the same as the other. Now I wish to know if the pearl is found in either of these, and if so, which? Tell me, if you please, what is the general appearance of the pearl-producing shell fish, and how large they average? E. D. B.

Columbus, Wis., Aug. 1857.

[Perhaps some correspondent can give the information desired, and it would no doubt be interesting to a great many. The fact that pearls are found in both fresh and salt water shows that the production of the treasure is peculiar to no one particular class, but it is very probable that the search in one of these varieties would be more successful than in the other.]

## Imitation of Black Walnut.

MESSRS. EDITORS—I noticed in your last issue that one of your correspondents inquires how pine may be stained so as to imitate black walnut. Now as I have done considerable of this, and as very often pine wood is desirable where the wood of walnut is not, I offer the following directions for an imitation which I have found satisfactory, should you think them worth publishing:—

Let the surface of the wood, after being thoroughly sand papered, be washed with weak alum water, and then treated with linseed oil colored by burnt umber and red lead. The umber should be thoroughly burned, but the coloring matter not made too strong. It is better to have it rather light, and renew the application. When this has sufficiently dried, go over the surface with a strong sizing of glue (transparent), and then use two coats of good copal varnish. Treated thus, any good grained pine will bear a very close resemblance to walnut, and the surface is nearly as hard. R. WHITTINGHAM.

New Berlin, N. Y., August, 1857.

## Rich's Water Wheel.

MESSRS. EDITORS—I saw a notice in your last week's paper, requesting to know if R. Rich's patent water wheel was extended? I would inform you that it is extended to July 8, 1863. It was patented July 8, 1842.

REUBEN RICH.

August 6, 1857.

## Colors for Magic Lantern Pictures.

A correspondent inquires as follows:—"Can you (or can any of your numerous readers) furnish me with information as to the nature of the colors used, or suitable to be used, in transparent painting on glass for the phantasmagoria? I have seen and tried several receipts, but found them all fallacious. Some of the colors tried have been varnishes, some gum colors."

The Annual Fair of the Middlesex Mechanics' Association will be opened at Lowell on the 10th of September. It will probably be an exhibition worthy of the great manufacturing district in which it is located.

A glass bottle and cork establishment is under way in California, for the purpose of furnishing the means of bottling up the native wine. Cork trees grow in Los Angeles county, in that State.