

WHAT IS A DIATOM.

One of the first beauties which are put on the microscopic stage for the gratification of a visitor is apt to be a group of diatoms, and beautiful as these minute shells are to the tyro, they possess doubled charms to the skilled microscopist, and give him opportunity for years of study. At the last meeting of the San Francisco Microscopical Society, President Ashburner read a very interesting paper, being a translation, by him, of an essay on the subject "What is a Diatom?" by Mons. Julien Deby, taken from the "Proceedings of the Belgian Microscopical Society," and, were it not for its great length, would find a place in our columns. The paper was illustrated by drawings on the blackboard, by Mr. Kinnel, and was a careful resume of all that is known of the life and history of these wonderful forms of vegetable life, as ascertained by the investigations of Mr. Deby, and which confirmed the researches of such distinguished contemporaneous diatomists as Thwaites, Wallich, Hofmeister, McDonald, Wm. Smith, Pfitzer and H. L. Smith. Aside from the elaborate description of the parts of the diatom, and their method of reproduction and conjugation, which was listened to with great interest by all present, the following general remarks are published, as they may give rise to more extended thought and study of these truly wonderful organisms.

"The little microscopic organisms, of which we propose to say a few words, are distinguished from non-cellular algae, properly so-called, as infusoria are distinguished from rhizopods, by certain well-marked characteristics. They form one of the numerous links which exist between what we are still disposed to call empirically the animal and vegetable kingdoms.

"The only connection between the surrounding and nourishing liquid in which the diatoms live, exists in the circumference, so to speak, of the connectives (between the valves of the frustule) also in certain pores, somewhat problematical, along the line of the connectives with the corresponding valves, and always in the form of linear joinings, which are only visible by means of our most powerful modern objectives. Neither pores or openings are probably ever found in the frustules of diatoms, notwithstanding the assertions of certain microscopists. Neither does solid matter ever penetrate from the exterior into the interior of living diatoms; they drink, but they do not eat.

"The curious active movements of certain diatoms always occur in an oblique manner (the principle of which is, however, obscure), by a vital action along the joinings mentioned. This is so true that if, owing to any cause, a frustule is stopped in its course by an unsurmountable object, the translating force is immediately seen to be converted into another, which causes all the small bodies about it, which are floating in the water, to move backward and forward with great rapidity.

"We believe that diatoms possess other means of reproduction beside that of conjugation, but the life history of these minute beings is too imperfect for us to venture any hypothesis in this direction. The modern appearance of species where none existed before; their periodical succession, year after year, at definite seasons, without being able to find any in the interval in the same locality; rise to the possibility of a mode of generation, which is as yet only suspected, by means of germs—by micro or macro zoospores, and, perhaps, in the first instance, with the formation of zygospores, as occurs in the case of living algae of the lower orders and situated under the same conditions as the diatoms.

"We forebode here a most interesting field of study, and one which is almost new to the naturalist provided with a good microscope and possessing the time and patience necessary for this kind of study; and we think we can say with confidence that whoever will follow with care the entire life-history of a single diatom, no matter how common the species, will render a greater service to science than by describing and drawing hundreds of the siliceous frustules from the four quarters of the globe."

DETECTING SHODDY WITH THE MICROSCOPE.

We find in the *Manufacturer and Builder* an article by Dr. Adolph Ott, giving a summary of the results gained by Dr. Robert Schlesinger in the detection of shoddy with the microscope. We quote as follows: "If the prepared shoddy is exposed to a magnifying power of 100 or 150, the scale of woolen hair will be seen by the side of the smooth silk thread, or the thick-walled linen thread, or the spiral-formed cotton. The color of these fibers varies generally very much, so that the object gives a very variegated image. After being thus persuaded of the presence of the various fibers, a drop of cuprammonia may be added for the sake of confirmation. This destroys silk and cotton rapidly, attacks then the linen and produces at last a swelling of the wool. If to another specimen sulphuric acid is added, the wool is dissolved and forms a red solution.

"After it has thus been determined of what fibers the shoddy consists, the wool must be more closely examined, that is, it is to be determined whether it consists completely or only partly of used hair. To this end, it is first necessary to compare with each other the color, structure and the chemical department of the two kinds. With regard to the color the difference is really great. In most shoddy there occurs colored and uncolored wool threads; the latter appear either perfectly white or they exhibit distinct traces of former color removed by bleaching. In the latter kinds the colored hairs are only of one color; in the inferior sorts several colors are generally represented. This alone is a strong proof that the shoddy has not been subjected to one common dyeing operation, but that their peculiar color is the product of a process which they have received formerly in a tissue of their own. All this is not discernible to the unaided eye. Another chief point of difference between the two kinds is to be found in their diameter; the hair of shoddy wool is never regularly formed and lacks the constant

diameter of new wool; it grows smaller either gradually or abruptly and grows wider in its deformed manner, in order to contract itself again or to assume a regular form for only a short distance. At some spots it is devoid of scales, at others it is torn, whereby the diameter sinks often below its ordinary measure, and a width of 0.01 millimeter or 0.0003 inch is not rare.

"By the microscope shoddy may be examined quantitatively as follows: Some specimens are prepared with the greatest possible care, whereby the precaution ought to be taken that the single fibers cross each other as little as possible but be parallel to one another. They are thus exposed to a magnifying power of 20 or 30 times, so that the observer may be able to glance at a large portion at once. He has to note now how many fibers there are of each kind; the numbers furnish the approximate proportions in which the several fibers have been mixed with each other."

THE HYGIENE OF THE HAIR.

Prof. Erasmus Wilson, who is probably the highest living authority on the subject, has lately given a course of lectures on the hair before the College of Surgeons in London. They are reported in full in some of the English medical magazines, and an abstract of the more practical portions is given in the *Journal of Chemistry*. Cleanliness is, of course, insisted upon as of prime importance, but washing the hair is emphatically condemned. Brushing is to be preferred, as it promotes circulation, removes scurf, and is in all respects a more effective stimulant than water. Cutting does not encourage growth as much as is commonly believed, but is advantageous in the case of the short, slender hairs generally called "young hair."

Of the countless applications recommended for the cure of baldness, few are ever successful, and in the occasional instances in which they appear to be useful it is possible that sequence is mistaken for consequence, the *post hoc* for the *propter hoc*. Most of these specifics are stimulants, not excepting petroleum, which has lately been endorsed.

Ammonia is Prof. Wilson's favorite stimulant; it is unlikely to create inflammation and its consequences; it is neither absorbable into the system, nor could it do harm if such were the case; and its odor, refreshing at the moment of its use, speedily evaporates. In a case of ordinary *alopecia* or falling out of the hair, he prescribes a lotion composed of strong liquor ammonia, almond oil and chloroform, of each one part, diluted with five parts of alcohol or spirits of rosemary, and made fragrant by the addition of a drachm of the essential oil of lemon. The lotion should be dabbed upon the skin of the head after thorough friction with the hair-brush. It may be diluted if necessary; it may be applied sparingly or abundantly; and it may be used daily or otherwise.

There are cases in which a less stimulating and even a refrigerating lotion may be desired, and where an objection may be raised to the quantity of oil contained in the above. In such cases a lotion of borax and glycerine, two drachms of each to eight ounces of distilled rosemary, and made fragrant by the addition of a drachm of the essential oil of lemon. The lotion should be dabbed upon the skin of the head after thorough friction with the hair-brush. It may be diluted if necessary; it may be applied sparingly or abundantly; and it may be used daily or otherwise.

In cases of complete baldness, and also in *alopecia areata*, a stronger stimulant application will be required. For this he recommends frictions with a liniment composed of equal parts of the liniments of camphor, ammonia, chloroform, and acetic, to be well rubbed into the bare places daily, or even twice a day, so as to produce a moderate amount of stimulation. In cases of *opisthotonus*, *trichotillomania* or the cutaneous nerves of the scalp, this liniment is very valuable. In other cases the liniment of iodine may be painted on the bare patches daily, or they may be rubbed with the ointment of cantharides or any other powerful stimulant. The intention of all these local remedies is to stimulate without setting up irritation; to increase the energy of circulation and innervation of the part; and in some instances to abstract the excess of fluids from the tissues of the skin by inducing exudation. But these results must be accomplished as far as possible without pain and without severity.

The constitutional treatment of *alopecia* should consist in the adjustment and regulation of the functions of digestion and assimilation; and, where no other special conditions are to be fulfilled, the adoption of a tonic regimen and the administration of tonic remedies. Of these last arsenic bears the palm, and may be advantageously prescribed in doses of two to four minims three times a day directly after food, and in any convenient vehicle.

Graviness, *cutis* or *poliosis* depends like baldness on defective powers of the skin, and the indications for treatment are exactly the same—to strengthen the part and at the same time strengthen the patient.

UNION PACIFIC BRANCHES.—General George Crook has been asked by one of the governing directors of the Union Pacific railroad to give his opinion in regard to the construction of two branches from the main line of that road, one from a point east of Sherman, Wyoming, to Rosemont, Montana, and the other from Rawlins, Wyoming, to the eastern branch at its terminus in Montana, the eastern branch to pass through the Black Hills, and the western through the Wind river country. The general makes a reply, under date of October 9th, 1877, of which the following paragraph contains the most important passages: "They will have a most salutary and positive effect in settling our Indian troubles, thereby saving large expenditures of public funds. They will invite to and open up for settlement most valuable farming and grazing lands, and in the discovery of new mineral sections, and promote the development of valuable mineral resources already discovered. They will save the public treasury vast amounts in economy of transportation of military supplies, of troops, and mails. From my personal knowledge of the country through which the proposed lines will pass, I regard the project as eminently practicable, and more easily accomplished than many of the works of similar character now in successful operation in the country west of the Mississippi.

IMPORTING FOREIGN RACES OF BEES.

As our apiarians have done so well by the introduction of the Italian bee, they are now putting forth inquiries to discover whether there are not other foreign races of the busy insect which it will be valuable to introduce. At the late meeting of the National Beekeepers' Society, in New York city, the following paper was read by Dr. E. Farnley, as reported in the *Beekeepers' Magazine*:

I desire to direct attention to the desirability of making efforts to import bees that have not as yet been tested in this country, which either pure or in some of their crosses, may prove an acquisition to the country.

The accounts we receive from abroad of the Cyprian bee are very promising, and it would seem from Mr. Gravenhorst's statement to be in some respects superior to the Italian. This bee has been treated at no great outlay. Mr. T. F. Reed, Treasurer of the New York society, has attempted a direct importation, and we hope soon to hear of his success.

Apart from the merits or demerits of the Italian as compared with the black bee, the importation has been of great benefit to us in familiarizing thousands with the habits of bees through study and experiments that otherwise would not have been undertaken and instilling many to seek improved methods of culture. From this came our bee papers which today have a large circulation and are much quoted by the agricultural press here and abroad, and we are now far in advance both in the practice and science of apiculture of where we were but a few years ago. We are now prepared for experiments with other races of bees; having verified many of the laws of bee life which will occur to every practical man without enumerating them.

As to *Apis dorsata* of Java, Borneo, Ceylon, an attempt is being made by an Italian beekeeper—Giuseppe Fiorini, of Mendocino—to obtain it. I think it desirable to get all the information we can about this bee, and as soon as received, send to our bee journals, and then if thought advisable endeavor to raise a fund to send for it. There are among us young men of skill and education who no doubt would be pleased to make the voyage, and at small compensation. Owing to the difference in the seasons this would be done during our winter, and the bees arrive here early in the spring, giving a full season for propagation and distribution.

Let us not rest satisfied until we have a thorough knowledge of the geographical distribution of honey bees, and by actual test know their merits and adaptability to different sections of our country.

I have endeavored to obtain specimens of *Apis fasciata*, but without success. I possess for examination some specimens in alcohol of bees from Mount Lebanon, which have the general features of the Italian; also a small bee from Java, which I know nothing about.

THE ORIGIN OF STORMS.

At the late meeting of the National Academy of Sciences, held at Columbia College, New York, Prof. Elias Loomis read a paper on the origin of storms, based upon data obtained by the United States Signal Service. He stated that our great storms begin in the neighborhood of the Rocky mountains, and that no example is found of any considerable storm arising on the Pacific coast, south of Oregon. At the outset there is generally an area of several hundred miles diameter, through which the barometer stands at mean. On opposite sides of this area, generally east and west, at a distance of 1,000 miles apart, are areas of high barometer. The atmosphere in these vicinities begins to move toward the central area. The currents thus established are deflected toward the right by the earth's rotation, and a diminished pressure results over the central area when the inflow increases and comes from all sides. The area of low pressure assumes an oval form, but if the winds are very violent, it may be more nearly circular. With rotation a centrifugal force is developed, which increases the pressure, and within the latter there is an upward movement of the atmosphere which carries large amounts of vapor, which, on cooling, condenses as rain. The heat liberated by condensation increases the rarefaction of the area, and thus rain increases the force of the storm though never originating it. The upward motion within the storm area takes place chiefly on the east side, so that the depression at the center is constantly transferred toward the east, unless, however, there is a great precipitation of vapor on the west side of the area, in which case the storm is held stationary or even moved westward.

THE UNDESIRABLE MORTAL.—A perfectly impassive, emotionless man or woman is a rarity; still, such do exist, and we hardly know whether to regard them as objects of envy or pity. Those without emotion, those who do not suffer at times from over-sensitiveness or excitement, are like rocks or trees; the winds of adversity may blow, a deluge of affliction may cover them; they remain calm and happy, the sleep is sound, the appetite unimpaired. Such are certainly enviable conditions, but the law of compensation is not annulled for the benefit of these favored ones. Wherever we find them, we may be sure that we meet those devoid of the finer and more delicate instinct of human nature—those who are incapable of enjoying the beautiful things in the natural world or in art. They suffer less in the journey of life, but they also enjoy less. Like animated statues they live, without strong friendship or affection, without pity, without generosity and nervous they die, with scarcely a pang. The world regards them with suspicion during life, and refuses to weep when they pass away. It is for wise reasons that but few of this class are permitted to make their advent into the world.

PROGRESS.—An exchange says: The car manufacturers at the West appear to have plenty of orders in hand, and the business has not looked so promising since the great collapse four years ago. The road shops are also full of work.

A NEW GAME FOR BOYS.

The best authorities among scientific persons have long conceded the fact that it is impossible to kill a boy by any of the recognized processes of demolition. He tumbles off chestnut trees and falls down wells with impunity; he is perfectly happy in the midst of harrowing railroad accidents; and, prematurely enthusiastic, the 4th of July explosions afford him intense delights; the most persistent book agents have done little more than discourage him, and able-bodied streaks of summer lightning have passed him by with disgust.

Yesterday afternoon there was a persistent recurrence of ominous silence and hilarious laughter among the two dozen or more carriers of the *Eastern Free Press*, that became so monotonous that we felt called upon to investigate.

We looked, and behold! the boys had invented a new game, having all the elements of dangerous fun necessary to perfect enjoyment. One boy stood with his back against the wall, the next boy stooped down his head in the first boy's stomach; the third boy stooped with his head on the second boy's back, and in this way the line was continued back as far as desirable. Then all the spare boys took a running leap in succession, putting their hands on the hindmost boy, and jumped over as many as possible, to come down at the end of the jump on a boy's neck with the force of an infantile pile-driver, and the next boy comes down on him in the same way; the efforts of the jumpers being directed to breaking the line of the stoopers or their necks, either object appearing to be equally desirable and attainable.

The position of the boy against the wall is one of great honor and responsibility. It requires a boy of strong stomach to enjoy the process of having the head of another boy driven into his waistband by the continued efforts of 15 of his fellows. Sometimes the jumpers become unreasonably enthusiastic, and the boy against the wall finds it necessary to step aside to swallow his dinner. This gives the stooping boy a chance to distinguish himself as his head is jammed against the wall so hard that he feels his ears sticking out under his arms. Sometimes it happens that a small, consumptive boy gets into the line of stoopers, and when a big boy comes down on his back he breaks in two, and this causes a hiatus that is immediately filled by the stoopers in the rear, who sprawl on their noses and elbows, while the remaining jumpers cavort over them like a cavalry charge.

We always like to encourage little games of this kind. They have a soothing effect upon market falls, the nose outside, and the undertaker. The game to which we refer has resulted in no mortality so far, but is only three days old, and we have an abiding hope.

MATRIMONY AMONG ENGLISH PAUPERS.

How one's ideals of the clinging and enduring nature of the marriage compact are shattered by the following: It has been very properly insisted that to forcibly separate old married couples in the workhouse is cruel and unnecessary. But in St. Pancras workhouse, according to a writer in the *Daily Telegraph*, the old couples do not care to live together. In the course of a graphic account of a visit recently paid to the workhouse he says, in reference to the rooms set apart there for old couples:

In fact, the married rooms are an utter and complete failure. The old ladies, so long as they can see their good men occasionally, apparently do not care to be bored with their perpetual presence, and they infinitely prefer a gossiping life in a dormitory of women. The old men shake hands with their partners at this last stage of their career, and take their pipes and their snuff-boxes off to the rooms where they can chat with male companions. The good wife, as I am advised to say, regarded by the St. Pancras pauper as a useful, and not an ornamental luxury. She was all very well when she was able to make a dumpling or boil a potato; but now that the boiling and baking, the cleaning and the bed-making, is done by ordinary workhouse routine, I grieve to say those selfish old gentlemen politely take off their hats and bid adieu to the "old woman" at the workhouse door. This is all terribly unsentimental, but it is a fact.

WORK AND PLAY.—Dr. John Strachan, of Edinburgh, has recently published a valuable little treatise, physiologically inquiring into the bearing of play upon education and training; and after some preliminary remarks he proceeds to state that the law of spontaneous development through play does not end with physical improvement, but that after a time the higher and more differentiated faculties come to be required for the perfection of the animal, and that the same law presides over their evolution. Play, he explains, that is apparently aimless, or, at least, not consciously directed exercise, is the means of securing the equable development of the brain and its faculties—memory, imagination, hope, wonder, and even special kinds of intellectual and moral activity, according to the endowments, and perhaps also the accidents of social position in the individual. "Exercise is accompanied by pleasure up to the limit of fatigue; beyond this limit, by pain or uneasiness. Special endowments or faculties brought into prominence by accident and after exercised are more, others are less, developed. But in every case there is a limit, and the only sure way of ascertaining the limit is by giving scope to the instinct; in other words, by allowing 'play' or apparently unregulated spontaneous impulse its due place in the work of education."

BRIGHT HOURS AND GLOOMY.—Ah! This beautiful world! Indeed, I know not what to think of it. Sometimes it is all gladness and sunshine, and heaven itself is not far off; and then it suddenly changes, and in dark and sorrowful, and the clouds shut out the day. In the lives of the saddest of us there are bright days like this, when we feel as if we could take up the great world in our arms. Then come the gloomy hours, when the fire will neither burn in our hearts nor on our hearths, and all without and within is dismal, cold and dark. Believe me, every heart has its secret sorrows, which the world knows not; and oftentimes we call a man cold when he is only sad.—*Longfellow.*