THE LAWS OF TASTE AND SMELL.

Dr. Hughlings Jackson, whose name has long been familiar as that of one of the first neurologists of the age, has just published a series of observations as to the relative functions of the olfactory and gustatory nerves, which are summarized by the *Phrenological Journal*: To understand how complex the sensation of taste, as generally spoken of, really is, it must be remembered, that the membranes of the mouth and the surface of the tongue are abundantly supplied with tact-buds, or papillæ of ordinary feeling; so that what is styled taste is always accompanied by a perception of form and consistence, and of heat or cold. Sliminess, for example, is a perception of the tact-buds, not of the taste-buds. Lastly, the distribution of the olfactory nerve is so intimately connected with that of the nerve of gustation that the two usually act in unison. Thus what is generally, though inaccurately, styled taste is a triple sensation, involving the simultaneous impression of nerves of feeling, smell, and taste. It becomes important, therefore, to discriminate, since the fifth pair, the glosso-pharyngial, and the olfactory nerves are all involved in the function of taste, and an impairment of the function, in the ordinary acceptation of the term, may imply lesion of either. In point of fact, as a general rule, when patients complain of impairment of the sense of taste, it will be found on experiment that the olfactory nerve is the part especially affected, and that there is really no loss of function in the fifth pair. A very simple experiment will settle this question. Drop a little essence of peppermint on a lump of loaf sugar, and place it upon the patient's tongue. The tact-buds will respond with a sensation of heat, and the taste-buds will perceive the proper taste of the sugar, if the function of the fifth pair is undisturbed; while, if there is defective olfaction, what is styled the taste of peppermint will be absent. Conversely, if the latter is present, and it is the sugar that remains unperceived, then the taste-buds have lost their function, and the olfactory nerve is not the seat of the lesion. Camphor in solution, dropped on sugar, is also a good test. The point is, that neither peppermint nor camphor have any proper taste, but are in reality smelled. Blood is said to have a salty taste; but in reality it is not the albuminous constituents of the blood, but several salts, held in solution in them, that are tasted. The remainder of the impression is one of flavor and of consistency, apprehended by the nerves of feeling and the olfactory filaments. And this brings on the distinction in function between the olfactory nerves and the filaments of gustation, as founded in nature. It is thus: Crystalline bodies, soluble in water, or in the secretion of the salivary glands, are tasted; colloid bodies, oxidizable in air, and susceptible of diffusion, are smelled. Thus sugar, salt, etc., are tasted, and have no effect whatever on the olfactory nerves; while, with colloid compounds, the sensation is due to an aroma that is apprehended by smell. With mixed bodies, colloid but holding crystalline elements in solution, such as animal and vegetable tissues, the so-called sensation of taste is always a mixed one. It would be a mistake to suppose that, because an aromatic body has a sweetish taste, the aroma and the taste are due to the same constituents. Carbolic acid has a sweetish taste, but aroma proceeds from unseparated impurities, and the more refined the acid, the less it impresses the olfactory nerves. The distinction, then, between smellable and tasteable bodies, is purely one of solubility in water or in air; and the sense of taste may be as readily destroyed by loss of function in the salivary glands as by loss of function in the taste-buds themselves. It will be seen, therefore, that to make a correct diagnosis in a case of this kind, involves an exceedingly careful and exact analysis of all the functions represented by the mouth and nose.

The East River Bridge Cables.—The Board of Trustees of the New York and Brooklyn bridge, says the *Iron Age*, have decided that crucible steel must be employed as a material for the wires from which the cables of that structure are to be spun. The Executive Committee reported that in consequence of the strong vote of the board in favor of awarding the contract for the wire for the large cables to the lowest bidder for crucible cast steel as decisive against the use of Bessemer steel, for in so important a matter as the main cables, it would, in their opinion, be unwise to adopt a material which is distrusted by any considerable portion of the trustees. The question of cost is an important one, but is subordinate to that of safety, and the difference of expense between the two is comparatively too small to permit such difference to prevent unanimity and entire confidence. They therefore, recommend that the contract for the steel wire for the large cables, as provided in the specification issued for that purpose, be awarded to J. Lloyd Haigh at 8 7-10 cents, gold, per pound, he being the lowest bidder for crucible cast steel wire, provided he furnish that kind of wire stipulated in his communication to this board, dated January 9th, 1877.

High Heels.—Prof. Sayre speaks of a form of what we may call fashionable disease: Accident may occur in descending stairs or steep declivities while wearing high-heeled shoes, which threw the weight of the body upon the front part of the foot, and the extra effort made for the purpose of retaining the body within the center of gravity produces a direct strain upon these tendons, causing rupture or stretching of the annular ligament sufficient to allow them to be displaced." It is no wonder then that fashionable women waddle in a most ungraceful manner when they attempt to walk. They destroy their comfort to follow a ridiculous fashion, and acquire an ambling and undignified movement. People do things to follow fashion that their good sense would cause them to be ashamed of under any other circumstances. Ladies wearing such shoes are often obliged, for safety, to go down stairs backwards; and our author says that they can be seen "every day descending the stoops of our fashionable residences in this manner, making pretense of talking to some imaginary person in the front door as an excuse to hide their awkward movements."

HOW BULLION IS PRODUCED.

We have mentioned our furnaces in a desultory way, but do not remember having seen any detailed description of their workings, although it is generally conceded that the furnaces in use here are as perfect in construction and capacity and do closer work on argentiferous ores than any in other localities. In fact, a smelter who has acquired his knowledge at the Eureka furnaces, has a reputation that no other place gives, sort of guarantee of competency. All the furnaces in Eureka, with the exception of two water-jackets at the Richmond, are modifications of the Raschette and Piltz furnaces, altered and improved to suit the combinations and qualities of the ore smelted. They are built of stone from the quarries in the vicinity, and lined with a porous fire-proof sandstone, of excellent quality, from Pancake mountain, about 20 miles distant. The inside diameter will average 4½ feet at the hearth, and the hight to the charging windows is about 16 feet. The hearth rises about 2½ feet from the ground and projects 18 inches from the mouth in the front of the furnace. On three sides and one foot above the hearth, eight tuyeres pierce the shaft, three on each side and two at the back. The shaft is carried through the floor and the charging windows open on the second story, or ore floor of the works, but the masonry extends to and through the roof, connecting with the flue or fume arrester. The tuyeres are double wrought iron pipes, a space intervening between the outer and inner pipe, through which a constant current of air flows, preventing the melting of the tuyeres where they are exposed to the fierce heat. The blast is furnished by a Root blower, with a capacity of 600 revolutions per minute, and is conveyed to the tuyeres by a system of tin pipes and canvas hose. The front of the furnace is open to a hight of 10 inches, the space between the melted slag and masonry being temporarily filled with a mixture of fire-proof clay, and removed at the pleasure of the smelter, when it becomes necessary to "tap out" or remove the slag. At the side is the lead well, connected by a pipe with the bottom of the furnace, the lead rising to the same hight in the well that it attains in the furnaces. The projecting hearth is supplied with two spouts, through which the iron and slag are drawn off into the cast-iron slag-pots. In the working process the furnace is filled with the ore mixed with a certain proportion of charcoal. Fire is applied, the blast turned on, and the furnace is in operation. The ore smelted is argentiferous galena, and contains from 40 to 60 per cent. lead, some iron, sulphur and arsenic. The heat concentrated on the ore at the mouth of the tuyeres, will reach 2,000 Fahrenheit, and under its influence the metals contained in the ore and the silica or quartz melt and flow to the bottom of the furnace. The lead, from its greater gravity, goes to the bottom, carrying with it the precious gold and silver. On the top of the lead the melted iron floats, and on this again swim the lighter materials termed slag. As the lead accumulates it is ladled out from the well into molds, forming base bullion bars, averaging 120 pounds in weight. These bars will assay from $300 to $400 per ton, varying with the quality of the ore smelted. Each charge is composed of 46 shovelfuls of ore, intermixed with 12 bushels of charcoal. No flux is necessary, with the exception of a shovelful of silica or slag, as the ores smelt freely. One of the furnaces at the Eureka Consolidated, now running, was built for a reduction capacity of 50 tons per day, but it goes considerably above this, averaging 65 tons every 24 hours, and has reduced as high as 90 tons, producing 10 tons of bullion.

The working force consists of one smelter, two slag-wheelers, two feeders and three ore and charcoal tenders. The smelters receive $3 per day of eight hours, and wheelers $4. The work is rather unhealthy—those most exposed to the fumes being subject to lead paralysis; but of late the attention paid to ventilation has remedied this in a great degree.

As we stated in the commencement of this article, there is no place in the world where smelting has attained a higher degree of perfection, and we are constantly improving our methods and processes.—*Eureka (Nev.) Sentinel.*

Physical Training.—Mr. MacLaren, on physical education, says: "However weak the boy, gymnastic exercises under proper training must be beneficial; use gives facility of execution, and facility of execution causes frequency of practice, because we all like to do that which we can do well; and thus eventually, being based on the organic law of development, the weaker parts may, by proper cultivation, be strengthened. Systematized exercises can modify the growth and distribute the resources of the body, so that each particular part shall have its legitimate share, and so increase the resources that each part of the growing frame shall have its wants supplied. During growth it is possible to add to proportion, consolidate and sustain every cell of every fiber or tissue as it is added to the frame; after growth this is not probable, but it is still possible; aye, still a certainty, to recover a valuable portion of the material well-being of every man, and add to that strength and vital stamina which will help him at all times, at all seasons and under all trials."

A Dam.—The following is a description of a dam recently constructed across the Kansas river, at Lawrence, and which has been estimated to furnish about 3,000 horse power: The dam is 788 feet in total length, 274 feet of which is based upon solid rock and built of masonry. The remainder spans a gravel and sand foundation, and is constructed of crib work, thoroughly based, anchored, grouted and backed. The dam has a base of 21 feet, presents an average angle of 45° to the current, and is so constructed that the power can easily be increased by adding to its hight. The flume upon the south side is 60 feet wide, and, as it now stands, 180 feet long, and is amply supplied with arches for the convenient delivery of power to penstocks. The track of the Kansas Midland railroad, connecting the Atchison, Topeka & Santa Fe railroad with the Kansas City railroad system, runs within a few feet of the flume walls.

SEASONED TIMBER MAY SHRINK.

The *Manufacturer and Builder* says: Scraping off the paint from a panel in a door will cause it to shrink, even when it has been unaltered for years, and supposed to be perfectly seasoned. Even the various most valuable kinds of timber will shrink more or less every time the surface is dressed off even a small fraction of an inch. Wheelwrights, accustomed to work in oak, are well aware of this fact, and a correct appreciation of it often enables them to turn out work of a superior character, even of ordinary materials, by first blocking out the pieces roughly, then allowing the timber to season, and working the various parts by degrees, as the seasoning becomes more and more complete.

White oak spoke timber, for example, may be allowed to remain in a rough state for half a score of years, under shelter, without becoming seasoned so thoroughly that the timber will not shrink after the spokes have been dressed out. Carriage wheels have often been made of the choicest quality of oak timber after every spoke has been seasoned for several years, and to the great surprise of the wheelwright, every spoke would work in the joints before the vehicle had run three months. The defect in such instances could not be attributed to inferior timber, nor to perfunctory workmanship, but simply to this one circumstance, that the parts of the wheel were put together before the timber had ceased to shrink.

To prove that the best quality of oak will shrink after a spoke has been dressed out, let a tenon be made on one end and be driven immediately into a mortise; after a few days' exposure in a warm workshop the spokes may be withdrawn with little difficulty. The same fact will hold good in the manufacture of wood work of any kind where oak is employed for tenons. In order to make joints that will never start, the piece on which the tenons are to be made should be dressed several times, until the shrinkage has ceased; then let the tenons be made. After these have shrunk, while exposed to the drying influence of a warm workshop, the spokes or other parts may be driven into their respective pieces, with the assurance (especially if they are dipped in oil paint previous to driving) that timber will shrink no more.

Many kinds of farming implements, in the manufacture of which oak and ash are employed, render very unsatisfactory service, simply because the seasoned timbers were not allowed to shrink before the tenons were driven into the mortises. In like manner, oak chairs and other furniture will frequently shrink to such an extent that the pommels, rungs, dowels, pin and banisters will all work loose if the precaution we have described is not observed.

USING PUTTY.

A wood-worker writes as follows in an exchange: A good joint is not all required in making a complete finish on wood-work, and one of the greatest troubles met with by unskilled workmen is the removing all appearance of nail or screw heads, having been sunk beneath the surface.

Putty, unless rightly put in, answers a very poor purpose, especially when the work is ever to be exposed to heat. Heat expands iron, and the nail or screw head will lift the putty and make it show a prominence on the surface of the, work.

Tacks or small nails may be driven so deep that putty will not necessarily reach the head, leaving a vacuum for the expansion, but for large nails or screws the plugging mode is the best. Sink the screws at least one-fourth of an inch below the surface, then square the hole and insert a plug of the same wood, precisely, as that in which the incision is made, and have the wood exactly correspond, that is, the grains to run the same way. Fit the plug with slightly beveling sides, so tight that when it is driven in solid, it will not reach the head of the nail or screw.

Apply glue to the sides of the plug before driving, and when well set, plane off the surface and sandpaper until the surface is level and smooth.

When putty is used it will be found an advantage to sandpaper thoroughly before filling the cavities, as dust of wood will partly fill the holes and prevent the putty setting in a solid bed upon the iron heads, and will be less liable to get lifted by expansion. Where large checks or cavities are to be filled with putty, the use of hot glue will greatly add to its durability. Moisten the putty with glue, just as it is inserted, and do not attempt to smooth up until it is thoroughly hardened.

The Poisonous Principle of Spoiled Corn.—Professor C. Lombroso describes two poisonous principles derived from spoiled maize: an oil soluble in alcohol, and an alkaloid. From these may be derived a body closely resembling strychnia, possessing all of the chemical and most of the physiological reactions of the latter alkaloid. In frogs, not only tetanic symptoms, but also those of paresis and narcosis, were induced by administration of the oil. In chickens, after prolonged administration of the oil, only paresis and convulsive movements of the head, with inclination to retrograde movements, were induced. The administration to chickens of the alkaloid, on the other hand, induces death in a few minutes, with previous paralysis of the limbs and chronic convulsions. Administered to locusts, fish, mice, etc., the alkaloid gives rise to symptoms similar to those of strychnia poisoning. Professor L. concludes, therefore, that two distinct poisons are present in spoiled maize.

Coffee Leaf Tea.—A correspondent, in a measure apparently prompted by the gradual deterioration in quality of Chinese tea, advocates the use of a decoction of coffee leaves, and the introduction of Mate or Paraguay tea. Mr. Alexander, of Redbank, as stated in the *Queenslander*, it appears, showed at the exhibition then recently opened at Brisbane some coffee tea, prepared from the leaves of trees growing on his estate, stating that the beverage prepared from those leaves was delicious, and far preferable to that obtained from the berry.

HOW TO MAKE OAT-MEAL CAKE

The *Rural Cyclopedia*, published at Edinburgh, Scotland, gives the following recipe for making oat-meal cakes. Well made they are delicious: "As much meal as will make a cake 24 or 30 inches in diameter and one-eighth of an inch in thickness, is put into a wooden basin, with a sufficiency of water for working the meal into a light paste. The meal and water are mixed by the fingers of the right hand, while the basin is turned constantly round by the left hand, till the paste is made; the paste is then turned out on a clean board or table, and alternately kneaded with the knuckles of both hands, sprinkled with meal, gathered up, kneaded and sprinkled, and kneaded again and again, till it becomes a well kneaded and homogeneous dough; the dough is then flattened out with the knuckles into a circular cake of half an inch or less, in thickness, and immediately afterward distended with a roller into a sheet about one-eighth of an inch in thickness. The sheet is then pared round the edges and cut into three or four parts from the center with a knife. The parts of the cut sheet of dough are fired or half baked, first on the one side and then on the other, upon a thin circular plate of iron, called a griddle or girdle; and then they are toasted or whole-baked, by being placed on their edge on a toaster close before the fire, with first the one side and then the other exposed to the heat. Some butter is sometimes mixed with the paste, to render the cakes 'short' and highly relishable, and occasionally a few caraway seeds also are added, but in the estimation of racy, unsophisticated cake eaters, all such admixtures are an abomination."

A Scotchman writing to the New York *Observer* in reference to these cakes and oat-meal generally, says: "The favorite accompaniment to this is sweet milk, dipped with the spoon (which has previously taken up and conveyed a portion of the porridge) out of a separate dish from the porridge."

OAT-MEAL BREAKFAST CAKES.

These are made of No. 2 oat-meal, with water enough to saturate it, and little or no salt. Pour it into a baking tin half an inch or three-quarters deep, shake it down level, and when this is done it should be so wet that two or three spoonfuls of water should run freely on the surface. Put in a quick oven and bake 20 minutes. Eat warm. It will be as light and tender as the best "Johnny cake," or else you have wet it too much or baked it too long. This is one of the most accommodating baked dishes that can be made. It will do very nicely with a little longer time if the oven is not quite hot. If it will not bake there at all, pour it into a frying pan, cover it close and set it on the top of the stove, where it will even bake in 15 minutes.

SUNLIGHT NECESSARY TO HEALTH

In his last quarterly report, Dr. John Liddle, the medical officer of health for the Whitechapel district, says: I firmly believe that many persons who are compelled to occupy rooms in which the rays of the sun never enter, soon lose their health, and find it necessary to change their residence; and this remark applies, although perhaps with less force, to those who are confined to counting-houses during the day in which no sunlight is admitted. Sunlight is especially necessary for the healthy existence of children; and this is strongly pointed out in the evidence of the late Mr. N. B. Ward (the inventor of the "Wardian cases," for rearing plants in towns, and conveying them to and from distant places, a gentleman of great eminence in the medical profession, and who has given much attention to the influence of the temperature, of air and light upon the health and growth of animals and plants) who says, in his evidence before the commissioners appointed for inquiry into the state of large towns and populous districts, that, as the result of his experience, the influence of light is a matter of the highest importance to the proper physical development of the human species; and whatever stints the growth of a child certainly operates upon his physical capacity for labor; that the amount of disease among persons occupying light rooms is infinitely less as compared with that in dark ones; and that the influence of light, especially solar light, in preventing the fatal termination of disease, is a fact well known to him. In further illustration of this subject, Mr. Ward quotes a fact stated on the authority of Sir James Wylie, "that the cases of diseases on the dark side of an extensive barrack at St. Petersburg have been uniformly, for many years, in the proportion of three to one to those on the side exposed to strong light.—*Public Health.*

SALAD.

In the preparation of salads America is far behind other countries. No French or German peasant can live without his salad. If lettuce cannot be obtained, a few cold boiled potatoes or string beans, with a bit of onion or parsley, will do just as well. Hundreds of bits and ends which are thrown away by an American housewife could be compounded into a delicious salad with a suitable dressing. In our cities the art of salad-making is rapidly advancing, and nearly every housewife prides herself upon the composition of a creamy mayonnaise; but in the country, where lettuce and hundreds of salad vegetables and grasses grow in perfection, the art of salad-making is almost unknown. Many recipes for salads of fish and meat and greens have come down to us in the old Roman records, showing that the people of olden time were not behind the present day in their attention to an appetizing addition to a meal. It is almost impossible to give exact directions for the mixing of a savory salad. This is something which should never be left to the hands of an ordinary cook, for no dish requires so much delicacy of preparation. Every cultivated man or woman should understand this subtle mystery. The salad is the æsthetic dish of the meal, the refreshment and recreation after the more solid plates which have satisfied the appetite, and it should be a direct offering from the hostess to the delicate palates of her guests. If the salad is delicious let no one fear for the rest of the dinner, for that is a direct index to the whole character of the *cuisine*.—*Helen S. Conant, in Harper's Magazine.*