second quality is priced at $45 to $62, and the spotted at $30 to $59. Then comes pure white, but not statuary marble. The price is $50 per square meter. The second quality is $35, and the third is $30. The veined marble brings on the first quality $50, and on the second quality $35. Violet-hued marble brings $70 to $100 per square meter. These are the ordinary tariffs, and on them the profits are absurdly high before the marble leaves the quarry.

DECISIONS RELATING TO PATENTS.

U. S. Circuit Court.—Southern District of New York.

TATE *et al. v.* THOMAS.

Wallace, J.:

When the language of the claim explicitly imports a certain arrangement into such claim,it is unnecessary to consider whether that arrangement is essential to the combination for the purpose of producing the result desired, and a machine which does not employ such arrangement is not an infringement of the claim.

The addition of certain elements to a patented construction which does not unfit it for performing its original result, but simply adds the results due to the new elements, does not avoid infringement.

Infringement is alleged of the patent granted August 22, 1871, to William John Tate for an improvement in quilting machines.

It is obvious that Tate was the first to invent a quilting machine which would produce the various complex and elaborate patterns which before his invention were produced by hand work. The nearest advance in the art before his invention had been made by William Muir, whose quilting machine is described in his patent of April 20, 1869. This machine could quilt in straight parallel lines like the stitching of the sewing machine, but it could also quilt in coincident zigzag lines, and thus form patterns defined by such lines. This latter result was effected by a single row of needles combined with devices for feeding the fabric to the needles, which would impart both a forward or longitudinal and a laterally vibrating movement to the fabric, thus causing the stitching to be done in waved or zigzag lines. Tate conceived that by employing two rows of needles and so organizing the feeding devices so that those for each row would operate successively, and not simultaneously, the zigzag lines of stitching of one row of needles could be made to meet those of the other row at the angle of the zigzag, and thus produce the desired diamond shaped pattern.

The defendant has incorporated Tate's alternating needles into the machine and then duplicated Tate's arrangement, and when this has been done each needle in one row is opposite a needle in the other row. No new result is obtained by the change, although an aggregation of results is accomplished. If the additional needles had not been inserted, the defendant's machine would quilt diamond patterns just as it does now. The machine is held to be an infringement. A decree is ordered for the complainants.

The Management of Scarlet Fever.

Scarlet fever is spread by contagion—by the transfer of particles of living matter from a person suffering from the disease. These particles of living matter come from the skin, from the membrane lining the mouth, nose, and throat, and perhaps also from the intestines and urinary organs. It is a disease which it is specially desirable to prevent the occurrence of in young children, partly because the susceptibility to its cause diminishes greatly with increase in age, and partly because it is much less dangerous in adults. There is reason to question the wisdom of using costly and troublesome methods of preventing the spread of measles, because the susceptibility to the cause of this disease remains in adult life, and it is, if anything, more liable to result in dangerous lung complications in advanced age than it is in children; but there can be no doubt as to the wisdom of restricting the spread of scarlet fever as much as possible.

The precautions to be taken when a case occurs in a house are in many respects the same as for a case of diphtheria, viz., to isolate the patient in an airy room having the least possible amount of furniture. The room should have no carpets or curtains, and no upholstered furniture, such as lounges, sofas, stuffed chairs, etc.

All the secretions and excretions, and all articles soiled by them, should be disinfected thoroughly and promptly while they are yet moist. A special and important precaution is to keep the whole surface of the body thoroughly anointed with some bland fatty matter, such as camphorated oil, vaselin, or cosmolin, and especial care should be taken to do this when convalescence has set in, and the peeling off of the skin has commenced. All toys, books, etc., handled by the child are dangerous, and had best be destroyed in the room by fire or by putting them into a vessel containing a strong solution of bichloride of mercury or of chloride of zinc.

No clothing, bedding, towels, or other woven stuffs should be taken from the room while dry; they should be placed in a tub or wash boiler containing scalding hot water, and thoroughly boiled before they are allowed to dry.

When the peeling of the skin has entirely ceased, the patient should be thoroughly bathed—using warm soap and water—be dressed in entirely fresh clothing, and the room and its contents should be thoroughly disinfected. The average period during which complete isolation of the patient is required, and during which he should not go out of his room or receive any visitor, is five weeks. Usually six weeks will be required to secure absolute freedom from danger.

The walls and ceiling of the rooms should be rubbed with damp cloths, which should be at once burned or boiled. The floor and all woodwork should be thoroughly scrubbed with soap and water.

The windows, fireplace, doors, and all other outlets of the room should be tightly closed, and sulphur be burned in the room in the proportion of one pound of sulphur to each thousand cubic feet—that is, if the room is fifteen feet square and eleven feet high, about two and a half or three pounds of roll brimstone will be required. Put the brimstone in an iron kettle, and place the kettle on a tray of sand three inches thick, or on a platform of bricks; pour a wineglass of alcohol on the brimstone and set fire to it, leaving the room immediately, as the fumes are dangerous. Let the room remain tightly closed for twenty-four hours, then open all windows and the fireplace, and let the fresh air circulate in it for from twenty-four to forty-eight hours. —*The Sanitary Engineer.*

English Law on Boundaries of Property

In Mr. E. L. Tarbuck's new work on "House Property," we note:

"In the absence of plans, figures, or rebutting circumstances, where a fence or hedge and a ditch are conjoined, the landowner on whose side either of the former stands claims the latter; the theory being that excavated soil was cast on the digger's land as groundwork for his barrier, which thus with the ditch forms the boundary, and the limit being the outer bank from the fence or hedge. Property in a fence or hedge between ditches or without ditch may be joint or rest on acts of ownership of long standing, as executing repairs, especially on demand.

"Posts and rails of paling are presumed to stand wholly on the owner's land, with pales outward and nails driven *home.*

"Joint proprietors of fences, etc., are not necessarily under obligation one toward another to preserve them, any more than a sole proprietor is similarly bound toward the adjoining owner or the public; but in both cases prudent precautions must be taken to obviate injury to others, as by scouring ditches, inclosing holes next public roads, preventing cattle straying, etc. Generally, the tenant (who must also usually preserve boundaries), not the landlord, is liable to actions in such cases. The time a fence has existed is one element in considering liability to repair it; and twenty years is the least period.

"Where a stream flows between properties, the presumptive boundary is the central line of water, use of which is shared between opposite owners, neither being entitled to injuriously affect the other or proprietors above or below by obstructing, diverting, diminishing, or polluting it.

"In the case of houses or grounds separated by walls used by both owners and built at joint expense, half on the land of each, and also where it is unknown at whose cost or on whose land such walls were erected, they are practically common to the parties, and either may exercise acts of ownership in building, etc., so that one does not prejudice the other. If a man builds on another's ground, the latter must set up his right within a reasonable period from cognizance of the trespass.

"In London, rights and liabilities of owners of party structures are regulated by the Metropolitan Building Act, 1855.

"At common law, a man has a right of natural support of soil, so that an adjoining owner must not by excavating cause it to fall. If a house has been erected above twenty years, there is usually a special easement of support from adjoining land or houses (as from party structures), the proprietor of which is liable for injury by settlement, etc., caused by him. In other cases general right to support or to notice to take precautions should be proved. Where a row of houses is built by one owner and sold to different parties, there is by implication right to joint support."

W. MILLS, of Bedford, finds the hydraulic or setting qualities of limes and cements are improved by mixing soluble sulphates, carbon, and certain other salts with the calcined material. The patentee prefers to heat silica, iron, and aluminum sulphates, iron oxide, carbon, and chalk, to redness in closed vessels; and then add the product, when cold, to fresh calcined limestone, grinding the whole intimately with some of the following salts, viz., potassium carbonate, ammonium sulphate, sodium carbonate, potassium sulphate, and iron sulphate.

Slipping Down by Sympathy.

The boys who render City Hall Park dangerous by day and night discovered a new diversion, on Christmas, so says the *N. Y. Sun.* A dozen or more of them were gathered at the southeastern corner about noon, tranquilly guying the passers-by, when a very large man slipped on the curbstone and waved his arms wildly in the air. He also yelled. After twisting himself into a dozen wild positions he regained his equilibrium, and continued on his way without having fallen to the ground.

It is a well known fact that a pedestrian will often fall to the ground in slippery weather out of pure sympathy for some one else who falls directly in front of him. Directly behind the big man who so miraculously escaped a fall was an earnest and sincere-looking woman, who was plodding along with her head bent down. She was in a reverie. Suddenly the big man leaped wildly into the air. As he did so he screamed. When a big man screams, the effect is eerie. At the same instant the woman sat down with a degree of heartiness that caused the bronze statue of Franklin, five hundred feet away, to totter on its base. The woman sat there and watched the man battle with the laws of gravitation until he conquered and went on his way. Then she arose and went on, looking snowy and uncomfortable.

The biggest boy in the gang, whose distinguishing characteristics were huge red hands and an unusually varied assortment of teeth, said to the others:

"Dat's a great steer, dat is. Th' nex' dame what comes along here'll do likewise if I bust a lung to show her. Youse bucks stand right here an' yell all your might when I slips. If we don't throw her widout layin' a hair, then I'll kiss a pig for luck. Watch me while I try it on."

The gang stationed itself beside a particularly slippery place on the walk, and the overgrown boy slouched down toward Broadway and loitered on the corner. Presently a nervous little old woman came trotting along. The Fourth-warder waited until she had passed, and then steamed up close behind, walked completely around her, and fell in her wake again. She halted, staggered, and then, with a look of wild surprise, trotted on again. Once more the awkward youth circled around her, and once more she increased her speed. Just as she arrived at the gang her tormentor came up for the third time, and, stepping directly in front of her, sent forth a howl of despair and sprang wildly aloft. At the same instant the gang yelled, "Ah, there? Stay there!" as one voice. It completed the confusion of the nervous little old woman, who clasped her hands over her breast, and went over backward as though struck by a thunderbolt. Chivalrously the gang assisted her to her feet, and sent her on her way, relieved of a few small things, and turned again to enjoy the sports of Christmas Day.

Vaccination against Yellow Fever.

The researches which have during the past two years been made by Dr. Domingos Freire have now reached a new point of departure. This investigator has prepared an attenuated virus with which he proposes to vaccinate individuals, with a view to rendering them proof against the occurrence of yellow fever. The Emperor of Brazil, having regard to the alleged innocuousness of the prepared virus, has authorized the practice of vaccination. Dr. Freire has accordingly vaccinated five hundred individuals. Three captains and all the crews of English vessels have been vaccinated with a view of escaping the infection from yellow fever, which prevails at Rio Janeiro. Thus far none of the vaccinated people have been attacked by the disease, and none of them suffered the least inconvenience from the operation. M. Bouley, who gave the facts to the Academie de Medecine, while implicitly believing the above narrated facts, does not yet implicitly accept the views of Dr. Freire on the Micrococcus xanthogenicus.—*Lancet.*

Galvanic Action upon Iron in Sand.

Writing to the *Engineer* on electric light cables, Mr. J. Johnstone, of Edinburgh, mentions the galvanic action set up by natural process between the metallic bases of earths and metals. He says that his attention was first drawn to the subject upward of forty years ago, when he saw an iron water main lifted out of a street in Greenock, where it had lain in a small bed of sand crossing the line of the street. At this part the outside of the pipe was covered with nodules, which were conglomerates of sand and oxide of iron. Inside the pipe, opposite to each of the exterior nodules, was a corresponding nodule of oxide of iron. These interior nodules were shaped like those found in cavities of hematite. It was therefore assumed by Mr. Johnstone that the inner nodules were formed as a result of galvanic action, which was transmitted through the body of the metal of the pipe from the nodules of sand and oxide on its exterior. Mr. Johnstone has never seen sand similarly adhering to lead pipes unless there was also lime in the sand. He considers that galvanic action fully explains the pitting that takes place in iron pipes that have lain long in sand, and which are thereby eventually destroyed.

New Metrical Abbreviations.

The International Congress of Metrical Weights and Measures has adopted the following new abbreviations. Italics are to be used, and are not to be followed by a period. The abbreviations are to be written on the same line as the figures, and after the last of them, be the number either an entire one or a decimal:

LENGTH.

Meter	*m*
Decimeter	*dm*
Centimeter	*cm*
Millimeter	*mm*
Kilometer	*km*

SURFACE.

Square meter	m^2
" decimeter	dm^2
" centimeter	cm^2
" millimeter	mm^2
" kilometer	km^2
Hectare	*ha*
Are	*a*

VOLUME.

Cubic meter	m^3
" decimeter	dm^3
" centimeter	cm^3
" millimeter	mm^3
" kilometer	km^3

CAPACITY.

Liter	*l*
Deciliter	*dl*
Centiliter	*cl*
Hectoliter	*hl*

WEIGHT.

Kilogramme	*kg*
Decagramme	*dkg*
Gramme	*g*
Decigramme	*dg*
Centigramme	*cg*
Milligramme	*mg*
Ton of 1,000 kilogrammes	*t*
Quintal of 100 "	*q*

—*Chronique Industrielle.*

Management of Cats.

It only required a glance about Dr. Edwin M. Hale's office to convince the visitor that some one about the house held the cat in high esteem. On the walls were portraits of that animal in various positions, and the same model was reproduced in cards, bits of applique, and china ornaments that decorated the mantels. Near the porch door was a little stand, on which sat a big white cat with jet black eyes, a pink nose, and a large bushy tail, which was never still. At the first sound of footsteps the white creature pricked up his ears, raised himself on his feet, arched his back, and the moment the doctor entered the room was on his shoulder, rubbing his neck against his master's face and purring softly.

"Oh, yes," said the physician, "Hafiz and I are very good friends; I have had him about eight years. My daughter brought him from London, and her experience getting him was rather odd. It is a matter of no little comment among tourists to note the habit existing in England of advertising cats, dogs, birds, deer, and fine breeds of poultry in the daily papers. In answering one of these notices a long correspondence ensues, and finally the would-be purchaser is given an audience. As a rule these very exclusive dealers have nothing of the Yankee straightforwardness about them, and it is a long time before they can be made to come to terms. The ex-Duchess or shattered Countess will throw out suggestions without naming any definite equivalent, and after considerable maneuvering you are incidentally informed as to the amount expected. Well, my daughter thought she struck a bargain, for she got puss for $10, but he is worth ten times that amount now.

"I have always had a great fondness for cats. I have given them a great deal of attention, studied their habits and peculiarities, and have come to the conclusion that, in order to preserve the health, smoothness and gloss of the fur, and the temper, one must regard the food, drink, housing, and general management. No error is more common than that of starving a cat to make it a good mouser. The practice has arisen from the mistaken notion that a cat kills rats and mice for food, whereas it is quite as much for sport. The cat should have at least two meals a day at regular hours. After each meal remove the dish, and never use it a second time without washing it. The quantity requisite can best be determined by experience. Oatmeal porridge and milk, or bread and milk, sweetened, will make a good breakfast. Use the same for dinner, with an allowance of meat or fish. Horse meat is used in France, but liver or boiled lights are better. Use fish during sickness; oysters are relished and very healthy, and no cat will turn up her nose at raw beef. An excessive amount of meat is bad. Boiled eggs should be used occasionally, and any vegetables that the animal prefers. My cat lives on beans, peas, and celery. Though the food should be ample, it is not necessary to overfeed the animal. Fresh milk should be given in abundance, and this with oatmeal will be sufficient generally, as the mice she will contrive to get will be an adequate supplement. A cat's disposition is spoiled by feeding her with delicacies from the table. This habit should be discouraged, and a little training will induce her to patiently await her time, even if she sits by the table during meals.

"Cats will never thrive without grass to eat. It is a panacea for all their ills; keeps the stomach in order, cools the blood, prevents humors, and aids digestion. It is supposed to aid in getting rid of the hair swallowed during the process of washing. During the winter it can be procured by keeping a piece of turf in the cellar or hothouse, or it may be cultivated in a flower pot. Cats are fond of asparagus, which many persons raise especially for them, and their natural preference for catnip will suggest a like course.

"A cat should be washed regularly with warm water and mild soap, dried with towels, and kept in a warm place to prevent cold. For state occasions, if the fur be lightly sponged with sweet cream, pussy will polish her coat up to its pristine beauty.

"Cats are subjected to nearly as many diseases as the human race. Hafiz is just getting over typhoid fever, and he manages to get diphtheria, malaria, catarrh, and everything else that is epidemic. Cats have symptoms of disease, and show them as plainly as children. Almost the first is a neglect of toilet; another is the rough condition of the fur, which loses its gloss and the hairs stand out. A hot nose is a sign of fever or inflammation, and when the cat shows a desire for great heat, there is a chill. Cats are so much admired at the present day that physicians are constantly being called upon to prescribe, and no one need feel any loss of dignity in doing so humane an act. When medicine is not given in the food, it is well to put on thick gloves in administering, in order to avoid bites and scratches. Then wrap the cat in a strong cloth, carefully covering the feet, and let an assistant hold it between his knees and open the mouth. Fluid doses, as glycerine and castor oil, should be given from a spoon in very small doses. If pills are prescribed, put the bolus well back against the roof of the mouth; powders or small pellets will dissolve on the tongue. Gentleness will be necessary in the operation, and the mouth and fur should be carefully washed in order to remove the taste of medicine. Generally, food should be withheld for two hours, unless otherwise directed. Cats are frequently delirious during teething, when the gums should be lanced, and a light diet of warm milk with plenty of clean water and grass given. In the adult the symptoms are wild, staring eyes, bristling hair, restlessness, and a tendency to climb up the wall or break through a window. The squeal is piteous, and the cry frightful; she will hide in the darkest corner, and die there unless attended to. In treating put on a pair of gloves, grasp the cat by the nape of the neck, wrap a shawl round the body, and with a pair of scissors slit one of the ears slightly in the thin part. Wet the ear with a sponge dipped in warm water to make the blood flow; a few drops will give relief. Give a dose of belladonna or hyoscyamus in half a glass of water, and put to sleep in a cool quiet place. It should not be disturbed for a day, as the operation leaves it in a nervous state, in which a slight sound will alarm it and cause a return of the delirium. Convulsions or fits are confined to young cats, and are caused by too much meat. They are of such short duration that little immediate relief can be given. A whiff of chloroform or ammonia may do, and to prevent her from running into the fire or doing herself injury throw a cloth over her and hold her quiet. If fat, reduce the diet; if poor and scrawny, give warm milk regularly and a little raw meat twice a day. If worms are the cause, I should prescribe half a teaspoonful of cod liver oil three times a day. If, during the fit, the cat becomes rigid, give nux vomica; and a dose of belladonna will cure bloodshot eyes. For inflamed eyes apply a wash of weak borax and water. After catching cold, cats will sneeze and show all signs of influenza. They may have sore throats, with diphtheritic symptoms, which they catch from children. Wrap the throat in flannel, wet with cosmoline, and give a few drops of sulphate of soda in water."—*Chicago Tribune.*

Diffusion of Oxygen through Silver Foil.

Platinum and iron are, as generally known, pervious to hydrogen at red heat. This characteristic deportment is probably related to that exhibited by several metals, in state of fusion, of absorbing or uniting with gases to feeble compounds. When silver in state of fusion is exposed to the influence of atmospheric air, it absorbs oxygen, which on subsequent cooling of the metal is but partially emitted. The investigation of this phenomenon by L. Troost has established the fact that the behavior of platinum and iron toward hydrogen is paralleled by that of silver toward oxygen.

A silver tube of one-third of an inch diameter and one-third of an inch thickness was surrounded by a platinum cylinder, and ignited by means of cadmium vapor in a muffle furnace. It was then exhausted with a Sprengel's air pump, and the exterior surface brought into contact with oxygen. A little less than a cubic inch of oxygen entered the exhausted tube in one hour, a quantity equal to 1,700, or about 200 cubic inches per square yard of surface. On substituting atmospheric air for oxygen, the diffusion of the latter became protracted, yielding but 3·2 c. c. oxygen, with traces of nitrogen, per hour.

Reduction of the silver foil from 0·5 to 0·25 cm. increased the diffusive power. Such a tube yielded 12 c. c. oxygen, or 3,330 c. c. per square meter an hour, and the volume obtained from atmospheric air was found to be 59 and 1,640 c. c. respectively. Diffusion of oxygen through silver foil takes place, though at a low rate, when the tube, instead of being exhausted, is charged with carbonic acid or carbonic oxide; of all gases, nitrogen possesses the least diffusive quality.

Avoidable Illnesses.

If men were to reflect upon the amount of illness, not to mention other evils, which they bring upon themselves, a total which ever increases with their self-development in civilization, they would sometimes question the reality of a progress which includes so many errors. Even if we leave out of sight the known results of faulty practice, there is still a large margin of what seem to be anomalous mishaps which day by day are shown to have had an acquired and avoidable beginning. It is always satisfactory to get at the root of these unaccountable flaws, especially when they nearly concern one's personal health. Their removal is then usually assured, and our former discomfort or dread is covered with the satisfaction of enlightenment and of remedial success. Trade work has at all times illustrated, and does still continually illustrate, the truth of these remarks. Let us grant all that is due to its energy and enterprise, and still the value of its productions is heavily discounted by errors which are not only due to oversight or ignorance, but often to neglect. In so far every one will admit the need of correction. By way of example, consider the case of staining and its applications. We showed a short time ago that some of the aniline dyes in the market, from whatever reason, were found to possess poisonous properties and to be unfit for dyeing articles of dress. Further evidence has not been wanting to confirm those observations. Another and older enemy of health, arsenic, has never been extirpated, but shows its front among us from time to time. Cases of poisoning by arsenical wall papers have been reported quite recently. The symptoms described, it is true, did not include the gravest possibilities, but chronic and intermittent ill health was proved to depend upon the presence of a highly colored paper containing much arsenic. Mere color, we would add, however, is no test of quality in this respect. The most innocent looking hues may be arsenical, and, conversely, the same tints may be had without any such poisonous admixture. Undoubtedly the only guarantee for safety is to be found in the discontinuance of this or other similarly hurtful substances as dyes in dwelling houses. While there is any doubt about the matter, no custom in decoration can be safer or better than that of distempering walls and afterward oil-painting them with some plain color.—*Lancet.*

New Primary Batteries.

Much ingenuity is being exercised in the design and arrangement of primary galvanic batteries intended for domestic electric lighting. According to *Nature*, an iron cell, invented by Dr. Pabst, of Stettin, is finding great favor in Germany. Its electrodes are carbon and wrought iron, dipping into a solution of ferric chloride. It is described as practically unpolarizable and self-generating; and it works at the expense of iron and of the oxygen of the air, which is absorbed into the liquid, while ferric oxide is deposited at the bottom of the cell. Its electromotive force is about 0·78 volt. It is claimed that the Pabst cell ought to prove of value for domestic electric lighting, as its internal resistance is low, and its constancy remarkable. Another primary battery has the peculiarity of consuming carbon in the liquid with which it is charged. Professors Bartoli and Papasogli are the inventors of this cell. The electrodes are composed of platinum and a compacted mixture of gas retort coke and Ceylon graphite. The exciting liquid is hypochlorite of soda. The drawback to the extensive utility of this battery is the lowness of its electromotive force, which is only 0·2 volt at the most.

Perseite, a New Sugar.

Muntz and Marcano have described a new sugar obtained from the seeds of the *Laurus persea*, a tree growing in the tropics. This sugar had been observed by Avequin in 1831, and by Melsens later; but it was by them supposed to be mannite. It is extracted by boiling alcohol, from which it crystallizes on cooling. Analysis gives it the formula $C_{12}H_{14}O_{12}$, isomeric with mannite. Its point of fusion is 183·5°–184°, while that of mannite is 20° lower. It is very soluble in hot, less so in cold water. Even in concentrated solution it has no action in the polarimeter. On adding borax, however, to a 4 per cent solution, it gave a rotation to the right of 0·55°. It does not reduce copper solutions, and is not fermentable. Boiling nitric acid converts it into oxalic acid, without the production of mucic acid. A mixture of strong nitric and sulphuric acids gives a trinitroperseite which detonates violently by a blow, and spontaneously decomposes.—*Ann. Chim.*

Factory Shoemaking in Massachusetts.

That most workmen in any particular locality are familiar with but one line of work is the most prominent characteristic of the shoe trade in New England. This is the most stubborn fact manufacturers meet who attempt to move their factories from Haverhill or Lynn to the towns of New Hampshire and Maine. The workmen in these latter places are skilled on coarser grades, but it is impossible to get nice light shoes from their hands.

There was little of system in the methods of manufacturing and distributing shoes in the early days. As late as 1836, all kinds and sizes, without reference to uniformity in quality, were packed in barrels, odd sized boxes, and whatever packing cases were at hand. There was no attempt to have a uniform number of dozen pairs of regularly assorted sizes in each case. After shoes were cut in 60 pair lots, it was seldom that the full 60 pairs were given to one workman, and they were usually given out in one, two, or three dozen pair lots. Consequently if they were put up in 60 pair cases, they would not be uniform in make or finish. But in the absence of some system of classifying and packing, it was simply impossible to do a large business in distributing, *i. e.*, jobbing, boots and shoes. By the year 1836, however, the jobbers were establishing themselves in the young and growing cities of the West and South, and demanded that their shoes should be put up in such a shape that they could be handled with system. With characteristic energy the manufacturers both of Lynn and Haverhill met this demand. In a little while they had devised a simple, complete, and convenient method of assorting, classifying, and packing their goods, which not only introduced system into their own methods, but also removed from the jobber a weight that had long hampered his business.

The growth of the jobbing trade, the extension of the canal and railroad lines, and the classification of the product into cases of assorted sizes, all the shoes in each case being practically uniform in quality—these solved the most difficult problem ever encountered by the shoe trade of New England, the problem of distribution. For even at this early date New England had made wonderful progress in the rather simple art of shoemaking, and if need be, compared with the demand, could make great quantities of them. The people of the West and South wanted them, and would pay for them; the problen had been to distribute them.

From the first the shoemakers of Haverhill had taken kindly to the manufacture of slippers. In the very early times it was not a large but a rather profitable business. As early as 1843 the trade had grown into considerable proportions, and there was regularly being made large shipments of slippers from that place. These were mostly "turns," generally without heels, and made by hand, of cheap kid, prunella, or light grain, and sold at $3 to $6 per dozen pairs.

Two other leading features of Haverhill trade at the same time were a half-heeled French edge pump, usually made of light grain, and sold at $8 to $9 per dozen pairs, and a cheap "welt" shoe for ladies' wear, mostly without heels, and sold at $10 to $12 per dozen pairs. Both these shoes were very popular in the South, and the pump was worn as a summer shoe to some extent in the cities of the North.

In 1857 there were nearly one hundred shoe manufacturers in Haverhill, and the yearly records show a steady increase in their number and the amount of their product. Meanwhile a new industry had sprung up, one that is now a necessity, one that has done much to simplify the process of making the factory shoe, and to cheapen, improve, and popularize it, viz., that industry which includes the manufacture, selection, and preparation of many of the parts that go to make a shoe. Included in this are sole cutters, the manufacturers of heel stiffenings, box toes, tips, staying blockings, etc. Although this industry had not then been carried to the perfection it has to-day, still as early as 1857 there were in Haverhill eighteen inner sole and stiffening manufactories.

In 1850 Haverhill manufacturers began to cut the Newark patent and enameled leather. At first this was made into "turned" shoes, later into a pegged Jenny Lind and a pegged spring heeled shoe, both for women's wear. For a time this patent leather was immensely popular.

In 1855, or thereabout, and from that time until the breaking out of the rebellion, fancy colored shoes were in demand. These were made of colored kids, sheep, and grain. There was a profusion of purples, bronzes, maroons, yellows, etc. Many, perhaps most, of these went South, and the trade dropped off very suddenly on the commencement of the war.

Shoes with heels had always been made in Haverhill, but very few had been made with high or anything but plain heels. In 1858, however, the trade began to call for a high, fancy heel. Workmen who could build such were not plenty. It requires considerable skill to make a high heel for a stylish slipper, building it up lift by lift, trimming each as it is put in place. It is no easy matter to get both heels alike. We are forced to admit that, however much the heel may lose in character, it certainly gains in uniformity when made and finished by machinery. But there was no heeling machinery in those days, no trimmers, burnishers, etc., and the expense of making these fancy heels by hand necessarily limited the sale of such shoes. The trade grew, however. and for years Haverhill has annually manufactured millions of pairs of fancy heeled slippers, low cut shoes, and ladies' boots.

Previous to 1857 the uppers were stitched by hand, mostly by the wives and daughters of the country shoemakers, and at their homes. But in that year the Singer sewing machine was introduced into Haverhill. The first cost $400. Experimenting with machinery was expensive business in those days. It required time, the outlay of money, and necessitated the damaging of a deal of stock to teach operators. No doubt the patience of the manufacturer was often sorely tried. If he overcame his own prejudices, he had to combat those of his operatives, and operatives in all lines of manufacturing have always looked with disfavor on the introduction of machinery. Under these circumstances it required some courage to take hold of and develop the possibilities of the new machines as they came up, one following another in such rapid succession.

To ourselves, says the Chicago *Shoe and Leather Review*, looking back over the history of the trade for the past thirty years, what were the grand possibilities outlined in the introduction of the first power machine into a New England shoe factory are all plain enough. It meant more than either the manufacturer or operative of that day dreamed, and yet to the wisest of these it was big with prophecy. To the manufacturer it meant the doubling and redoubling up of his product beyond even the dreams of his earlier experience; the opening up of opportunities for wealth and influence not possible under the old system. To the operative—well, to him it meant something vastly different, and in the light of the results one can hardly blame him for having fought stubbornly, step by step, the introduction of machinery. Under the old system, his wife and his daughter, in the intervals of their household duties, and in their own home, stitched the uppers. He in his own home, or in his own little shop, made the shoes. Through it all he and they were surrounded by the quiet, healthy influence of their New England home. Under the new system his wife and daughter in the heated, foul aired, and crowded factory, surrounded by the vicious and demoralizing influences of the factory system, work the long hours of the working day, he likewise. What does it signify that their wages are better? Are the conditions of their lives better or worse? But machinery came, and that, too, when once started, with wonderful rapidity. Closely following the Singer came the Grover & Baker and other sewing machines for stitching the uppers. In 1859 Blake brought out his sole-sewing machine. It was a crude affair at first, but Gordon McKay, then a capable mechanic about the mills in Lawrence, saw it, and seeing the possibilities in the machine, associated himself with Blake in its development. Improvements were devised, and, at last, ten machines were pronounced good and sent out. Nine of these were moderately successful, and of these nine Haverhill had one. The McKay machine almost completely revolutionized the business of shoemaking. In early times shoes were hand made, either by the welt or turn process, but on the introduction of pegs it had come about that nearly all medium and low priced goods were pegged. Pegs being cheaper that the two seams of the welts, and yet quite effective as a fastening, took the place of welted shoes.

When the success of the McKay machines had once been thoroughly established, however, the bulk of these goods—in fact, all the cheaper sewed grades, and many of the pegged—were made machine sewed, and but one seam was required in uniting sole and upper. The pegging machine, which has been used a good deal, soon followed. Then came the development of what may be called the finishing machinery, heel trimmers and burnishers, edge trimmers and setters, bottom finishing and buffing machines, and a score of others, until, as early as 1870, the factory sytem had been completely developed.

The Wish is Father to the Thought.

There is probably no human faculty that is more in need of faithful and patient cultivation than the judgment, for there is none that has more complications to deal with or more difficulties to overcome. Nevertheless, there is perhaps none which receives less systematic discipline or upon which people generally are less willing to expend labor and thought. They train their children's memory; exercise their powers of expression; school them in habits of industry, endurance, patience, and self-control; but seldom discipline their judgment or teach them how to draw correct conclusions. That, they suppose, is something which time and experience will do for them; yet when they see what hasty opinions and ill-advised judgments are continually formed by older people, they might infer that some definite education in this respect was necessary for both young and old.

There is a universal tendency to believe as really true that which is desired to be true; and to resist that tendency is perhaps the first and most essential step in this kind of mental discipline. Some new theory is propounded which excites human sympathies. It is hoped it can be established, and, with that feeling, those who like it proceed to investigate it. Although they doubtless mean to be impartial, they yet welcome the evidences in favor of it with alacrity, and listen to the objections against it with reluctance. Unless they are very much upon their guard against this influence, they will accept the theory upon insufficient evidence, and, whether it be true or not, their belief in it will only prove their weakness. Or some proposed reform is presented to them, against which their accustomed habits of thought and their prejudices rebel. Perhaps it may involve duties which they should dislike or sacrifices they are not ready to make, and they sincerely hope it may prove to be wild and visionary. Now with such a bias they are in danger of deciding against it, simply because they do not like it, although they may imagine they have given it the most impartial consideration. A charge is made or a report is circulated against their friend or their favorite candidate. How indignantly they resent it, and, when proofs are offered, how they struggle to refute them! But let similar charges be brought against their foe or the candidate of the opposite party, and how willingly they listen to them, how easily they can be brought to believe them! One man is by constitution and habit of mind conservative; he clings to old ideas, old habits, and old fashions, and his impulse is to reject new notions and new customs because they are new. Another by birth and training is radical; he lets old things slip from him without a pang, and receives all novelties with open arms.

Now all these impulses are natural and not to be condemned, but they are impulses for which due allowance should be made in forming any judgment and in drawing any conclusion. All preferences impose an obligation to give more weight to the opposite side. As men know they will be influenced by their wishes, they should insist upon dwelling longer and more carefully on the arguments that thwart them. They should practice a wholesome self-abnegation as far as possible, resisting the force that agrees with their wishes, and welcoming that which opposes them, thus doing all in their power to restore the balance which an intense desire has destroyed. Professor Faraday, to illustrate the rarity of impartial judgments, alludes to the very common amusement of fastening a ring to a long thread and holding it suspended over a glass to notice its movements, and see whether it will tap the glass at the mention of some name or letter, or other signal. Though every one who tries the experiment disclaims the possibility of an involuntary motion of the hand in the desired direction, Prof. F. said he had rarely seen any one who was willing to put it to the proof by screening the object from sight and having its position then changed. Yet it would seem that any one really desiring to discover the *truth* about even so trifling a matter would eagerly welcome every means that could throw light upon it.

One effect of resisting inclination in the exercise of judgment will be to prevent hasty decisions. There are emergencies when rapid judgments must be made and speedy action must follow. But it is likely the larger number of conclusions would be improved by delay. It is an easy thing to accept as true or best what we wish to be so without weighing or sifting the evidence. But to judge wisely and well takes both labor and time. Suspension of judgment at certain times and for certain periods is the best mental state men can be in. When we remember how many complex conditions are involved, and how difficult it is to understand and appreciate those conditions, and to accord to each its protionate value, we may well pause and reflect before committing ourselves to judgments which may prove to be wrong. When men attain a true conception of the knowledge, thought, and wisdom that are required to form wise opinions, or draw correct conclusions upon even ordinary subjects, they will be in less haste to proclaim their ignorance by forming rash judgments; and when they realize the importance of bringing energy, patience, and self-abnegation to the task, they will become better fitted to bear the responsibilities and arrive at the decisions that life requires at their hands.—*Philadelphia Ledger.*

A Japanese Dentist.

The Japanese dentist does not frighten his patient with an array of steel instruments. All of his operations in tooth drawing are performed by the thumb and forefinger of one hand. The skill necessary to do this is only acquired after long practice, but once it is obtained the operator is able to extract a half dozen teeth in about thirty seconds without once removing his fingers from the patient's mouth. The dentist's education commences with the pulling out of pegs which have been pressed into soft wood; it ends with the drawing of hard pegs which have been driven into an oak plank with a mallet. A writer in the *Union Medicale* says that no human jaw can resist the delicate but powerful manipulation of the Japanese dentist.