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A GREAT INVENTION IN WEAVING.

James H. Northrop, of Hopedale, Mass., is the author of a large number of new inventions relating to weaving machinery, for which patents have been granted within the past three or four years or more. Some of these improvements have been put into practical shape by Messrs. Draper, the assignees of Northrop, and the results are such as to justify the prediction of an impending revolution in the economics of the art of weaving.

One branch of the Northrop inventions consists in devices for the automatic filling of shuttles in single shuttle looms, whereby the frequent stopping of the machine for refilling, or in consequence of breakage, is avoided. The practical result is that one first class weaver, who is now capable of attending six looms, is enabled, by means of the Northrop improvements, to attend sixteen looms, all of them running at the usual speed, so that the quantity of cloth produced is more than doubled without any increase in the cost. The Industrial Record says: "The invention is in practice in a mill where 400 of these looms are in operation, running at the rate of 190 picks per minute, the usual speed of a print loom. It is said that more looms can be run by one operative, but we will be satisfied with sixteen. This is enough for the incredulous, and doubles the number of looms that a first class weaver is now capable of handling on print cloths. One-half the labor cost is saved in this particular alone. But in actual experience it has been found that more than this is saved on account of the greater production per loom due to non-stoppages for supplying fresh filling.

"The labor cost in one yard of print cloth is about one cent, and four-tenths of this is represented in the cost of weaving. In Fall River, weavers receive 18 cents a cut of 45 yards. The labor cost in two Lowell print cloth mills is 5.90 to 6.01 cents per pound, and that of weaving alone is 3.46 to 3.54 cents per pound. It is safe to say that about half the cost of manufacturing is in the weaving, hence any saving here is a matter of some moment, especially when it attains the proportion of fully one-half. Calling the annual production of print cloths by Fall River mills at 10,000,000 pieces and we have a saving in the cost of weaving of \$900,000, or nearly one-half the total dividends paid by all the mills of that city in the prosperous year of 1892, or nearly equal to all the dividends paid in 1891. In the manufacture of print cloths alone in this country a saving in the cost of labor can be made of \$2,500,000 by this new loom. This saving in the cost of manufacturing is not necessarily a loss to labor, for the latter can be but temporarily idle, as it will be wanted in some remunerative form in factory employment due to the increased demands on manufacturing that lower cost to the consumer always brings about.

"There are in the United States, as near as we can estimate, about 360,000 cotton looms, 75 per cent of which are on plain cloth, and running single filling boxes. At least one-half of this full number of looms (180,000) are under 36 inches wide; most of them under 32 inches wide. These 180,000 looms and those operating them come directly within the influence of this Northrop invention as it is to-day. Allowing six looms to a weaver, and we have 30,000 weavers directly affected and likely to be reduced one-half in number, at a very conservative estimate, should this loom come into general favor. One female in four over 16 years of age, employed in our cotton mills, assuming that cotton mill weavers are females over this age, is sure to feel the potency of this invention.

"It is not for us or any one else to say how far the ideas or principles of this invention can be carried. At present it seems to be limited to the use of one shuttle, and though in its present form it may not be able to get beyond this, it is not easy to say how suggestive it may be of devices that will adapt it to a number of shuttles. If it can be made applicable to drop box looms, then it will affect the manufacture of ginghams, upholstery goods, etc., where different kinds or colors of weft are required. As it is, it is confined to the cotton manufacturing industry, but it requires no great amount of credulity to apply its usefulness to the needs of the woolen industry. This is one of the curiosities of textile inventions, their first development and application in the manufacture of cotton fabrics. This was so during that great era of inventions in the latter half of the eighteenth century, notwithstanding the insignificance of the cotton industry and the relatively great importance of the woolen industry, and it has been so ever since.

"The woolen mule was a thing that was thought to be impossible for fully thirty years after the self-acting cotton mule came into being. The worsted spinning frame was a creation after the spinning frame for cotton had long been in common use. The woolen loom can lay some claims to being in advance of the cotton loom, where complication in design of the woven fabric is desired, but there is here a suggestion that may be found as applicable to the woolen as to the cotton loom, and give the latter the lead."

MANY acres of land in Gloucestershire are devoted to the raising of wood for walking sticks.

THE DESERTED VILLAGE.

The village life of old times has been the basis of many an idyl in prose or verse. A village represents the center of the isolated community, made isolated by difficulties of transportation both of freight and person. Before the days of MacAdam every mile of boulder-infested, sandy and muddy roads exhausted man and beast alike who were concerned in the transfer of wagons over it. In England where, owing to the very large proportional population, traveling was extensively indulged in, the matter had become very serious in the last century. The great lumbering stage coaches would be dragged over roads which in the contemporary literature are described as absolutely inspiring terror. But London was not then the absolute metropolis of the country. All through the land there were prosperous villages, whose inhabitants led cultured lives and very rarely journeyed to the large cities.

Then MacAdam evolved his plan of making roads with broken stone, formulating the curious precept that no stone must be used which was too large to go into the mouth. He would take a piece of road filled with boulders, and breaking them to fragments, would make the road supply all or a great part of the material required for its own construction. William Cobbett, at the beginning of this century, representing the agriculturist, inveighs against the use of broad tires imposed by the authorities upon those who traveled upon the new roads which then began to traverse England in all directions. These roads enabled stage coaches to make ten miles an hour, and the population began at once to centralize more than before, and we find Cobbett again lamenting the growth of the "Wenn," as he termed London.

When the railroad replaced the stage coach, the growth of London and of the other great cities began in earnest. Meanwhile, in this country, the New England States had become filled with villages. The white-painted gable houses with green blinds, the village green, with town hall, public school and church facing it, had become characteristic features of these settlements.

For the better intellectual development of the natives or inhabitants of the villages, lyceums were founded, which arranged for courses of lectures to be given on various subjects. The life seemed, to a certain extent, ideal. There is in humanity a theoretical desire for repose and absence of strife, a desire which in many cases is purely theoretical, and whose exponent was found in the New England villages and communities of the same type in other States. The intellectual element of these places was responsive to the life of the day, and it is surprising how many of our greatest men have come from villages.

To-day the change is complete. The villages are being rapidly deserted. When factories began to be built of the large scale, they were placed in villages, but centralization has affected them also. They have left the villages, and Lynn, Fall River and similar cities have become great manufacturing centers, each representing enough industry to maintain all the villages in a State.

Some years ago the deserted farms of New England were made the subject of investigation by the government. Farms, which long ago were the objects of careful cultivation, and which seemed to the owners to represent the acme of progress, have been thrown upon the market at ruinous prices. They are gradually being taken up in part by French Canadians, who seem to bring with them some of the frugal and industrious traits of the old country French farmer. Now the deserted village takes the place of the deserted farm as an object of interest and of solicitude. The young people used to want to leave the farm, and did it. Now they want to leave the village, and are doing it. Steam railroads, supplemented by the electric road, cause that which is really an immense area to be subsidiary to each large city.

Mechanical progress affects all classes, and the inventor touches the life of every class. The farmer and villager at first sight would seem relatively little affected by modern machinery. But improved tools made farming more effective; steam was applied to its processes, cheapening them greatly; the railroads took the crude or raw products to steam mills, ending the work of the country grist mills. And now the railroad and trolley have taken the personnel of the farm and village in hand and have transported them to the city, and village life, such as it was even thirty years ago, is ended by the progress of mechanical art. The story of Concord, in Massachusetts, with its authors, Hawthorne, Emerson, Thoreau and the Alcotts, will hardly ever be told of any future village. The mechanic and the inventor have settled the question forever.

It would be hard to find a better instance of the effect of mechanical progress upon the home life of a nation. It may even have an effect upon its literature, for the quality of books is certainly affected by environment, and the inventor, scientist and mechanic have determined a new environment for the active portion of humanity.

Prof. Karl Ludwig.

A cablegram of April 27 announces the death of the eminent physiologist, Prof. Karl Ludwig, at Leipsic, Germany. He was born in 1816, at Witzenhausen. He studied medicine in Marburg and Erlangen. In 1841 he was made demonstrator, and in 1846 professor of anatomy at Marburg. In 1849 he was called to the chair of anatomy and physiology at Zurich. In 1855 he became professor of physiology in Vienna. In 1865 he took the chair of physiology at Leipsic, which he held at his death. Prof. Ludwig was one of the greatest physiologists of the world, ranking with Claude Bernard. He discovered the kynographic method for the study of blood pressure. Among the best known of his writings are, "The Gas of the Blood," "The Structural Conditions of the Heart, Liver, Kidneys, and Other Internal Organs," and "The Secretion of the Kidneys."

General John Newton.

General John Newton, one of the best known engineers in the country, died at his New York home on May 1. He was born at Norfolk, Va., August 24, 1823, and he showed from an early age a remarkable predilection for mathematical studies. He secured an appointment to the Military Academy at West Point, from which he graduated in 1842. He occupied the position of assistant professor of engineering while only a second lieutenant; he was later assigned to important engineering works along the Atlantic and Gulf coasts. He distinguished himself in the civil war by gallantry in the field and by able engineering work. On March 13, 1865, he was rewarded with the brevet of major-general of volunteers, and of brigadier-general and major-general of the regular army. In 1866, General Newton, as lieutenant-colonel of engineers, was ordered to New York to begin improvements, the greatest of which was the removal of the rock at Hell Gate. He resided in New York from this time until his death.

General Newton's wonderful engineering skill in removing these rocks, which had proved so dangerous to navigation, excited the admiration of engineers all over the world, and he received many honors. Hallett's reef was destroyed on September 24, 1876, and Flood Rock some years later, on Oct. 10, 1885. He also superintended the defenses on the Long Island side of the entrance to New York Harbor, the improvements of the Hudson River, the fortifications of Sandy Hook, the channel between New Jersey and Staten Island and various harbors on Lake Champlain.

On March 6, 1884, he was made chief of engineers in the regular army with the rank of brigadier-general, and at his own request he was retired on August 27, 1886. The next day he was made commissioner of public works of New York City, and for more than two years a wholesome example was given of the administration of a great city department from which politics were absolutely divorced. General Newton declined a second term and retired to private life. He became president of the Panama Railroad Company, which office he held at the time of his death.

Charles H. Cramp.

Charles H. Cramp, the Philadelphia shipbuilder, is an interesting man. In almost every way he differs from the common order of man. Mr. Cramp's fame as a shipbuilder will soon be added to, when the American liners, the St. Louis and St. Paul, are added to the fleet of the American Line. The St. Louis will start upon her first trip in about three weeks and the St. Paul not long afterward. England is watching for this event with great interest. There is probably not a person directly interested in the great shipyards of England that is not already wondering how these two ships which have about been finished in the Cramp yards will turn out.

Just now, at the beginning of a new epoch in our history of shipbuilding, Mr. Cramp becomes unusually interesting to the public. He is frequently in New York, and I saw him at the Waldorf the other day, the center of a group of friends. Mr. Cramp is known to laboring men all over the world as a model employer. He has never had any trouble with his workmen, and most of the six thousand odd men employed in his yards to-day were preceded by their fathers and grandfathers, and in many cases by their great-grandfathers. This great firm was founded by William Cramp, the father of Charles, and the present head of the firm learned the trade in his father's yards just as any other apprentice would. Mr. Cramp grew up among these men, and has always felt as if he were one of them. He has frequently said that his success was largely due to the loyalty and friendship of his employees. Every man employed in the yard feels a much greater interest than if he was a mere wage earner only interested in what he made. If he were a stockholder in the company, he could not feel more loyal than he does. He knows that if he gets sick his family will be provided for. If he wishes to attempt to improve his financial condition by going into business, the Cramps will help him. There are hundreds of shopkeepers in the vicinity of the great shipyards who were helped to get

their start by Mr. Cramp, and many of these have grown to be well-to-do. A number of those who have held high positions in the municipality of Philadelphia were workmen in the Cramp yards. If one of his men runs for an office, the Cramps will help him in his canvass, and it makes no difference as to what party he belongs. Mr. Cramp is nearly seventy years of age, but he does not look to be much over fifty, and he certainly has more vitality than the ordinary man of that age. He always seems to be on the go, but never complains of being tired, and I have often wondered if he were born to never know fatigue. With all the great responsibility and worry of detail that he is called upon to look after, Mr. Cramp's amiable disposition never changes; he is always cheerful and agreeable.—Commercial Advertiser.

Character and Physical Conditions.

Perhaps, after all, in our pursuit of harmony in our lives, we are not paying enough attention to physical conditions. Science pretends to have made great progress in interpreting the relations of body and mind. We have, on the one hand, the advocates of physical culture as the reconciliation of our disordered faculties, and on the other the zealots who have a mind cure for every physical ill and disturbance. Training and diet for a specific and temporary purpose, like football contests or the ordeal of oratorical competition, we are familiar with. But anything like a broad, scientific study of the results of specific diet has hardly been attempted. There are certain popular notions afloat on the subject, as that fish and celery are good for the brain. The moral reformers have forced us to consider the properties of tea, coffee, and alcohol, and the physicians unite in condemning or commending at different times the same article of diet in relation to the health of patients. But the effect of different kinds of food upon people in a normal condition, upon the power or quality of their brain work, upon their dispositions, upon husbands' treatment of their wives, is hardly considered. We blunder along till we reach middle life, experimenting without any scientific programme, and at last, when the game is almost over, begin to learn what to avoid, and so mitigate the failures of our remaining years. We do not treat horses this way, or cows, or dogs from whom we expect any intelligent service in hunting.

We know that some plants are stimulants and some are narcotics; there is a belief even among savages that certain articles of food give courage and others make the eaters chicken-hearted. There is good reason to suppose that every sort of food, vegetable or animal, has an action as specific as what we call drugs have, and a specific relation to human quality and capacity. We calculate roughly that such a thing is indigestible, or that another article of diet increases nervousness—the special disease of this period of time. But we do not study what diet will make a man kind, or truthful, or a lyric poet, or an honest historian, or a disinterested politician. We have got so far as to see that we must discriminate about medicines, but it would be as reasonable to expect a dozen persons with as many maladies to go to the drug shop and swallow the same kind of doses as is the spectacle of a dozen people at a dinner table, all unequal in mental gifts and habits and in physical status, helplessly eating the same things.

This demoralization of the taste is probably a sign of a deeper insensibility. We may not be able now to prove that a bad egg will produce a bad man; it may be that only a bad man will eat a bad egg; but as we know that a man's disposition is affected by what he eats, and that much of the evil in life comes from bad digestion, it is a fair inference that moral and intellectual qualities are transmitted in food. It is the business of science to make better men and women. It gives itself great airs about heredity, but hitherto has done little in the investigation of the subtle causes of the so-called hereditary qualities in our consuming relations to the animal and vegetable world.—Harper's Magazine.

A Valuable Hint.

"My husband," said a physician's wife not long ago, "chanced to see one day, standing on a shelf outside our kitchen window, some moulds of jelly cooling for the night's dinner. They were uncovered, as they were out of reach of cats, and in full view of cook's watchful eye; but he questioned me about them, and asked if it was our usual custom to leave jelly thus unprotected. I was obliged to reply that, so far as I knew, it was. 'Then,' he said, 'don't you know that when we medical men want to secure minute organisms for investigation, we expose gelatine to the air or in places where we have confined malignant germs? The gelatine speedily attracts and holds them. I'm afraid your flavored gelatine does the same. Cool the jelly if you must, but cover it with a piece of close muslin.' And we have always done that since then."

It is to be feared that kitchen processes are sources of illness more often than is imagined. In many city houses the little kitchen annex where stands the refrigerator, and where various eatables are kept, is directly against a drain. Yet here stand daily uncovered milk,

butter, often custards and puddings, and various other absorbents. The average cook is absolutely ignorant of sanitary cause and effect, and the eternal vigilance of the house mother is the family's chief safeguard.—Boston Journal of Commerce.

The Monkey and the Sugar.

A tame monkey in India recently was given a lump of sugar inside a corked bottle. The monkey was of an inquiring mind and it nearly killed him. Sometimes, in an impulse of disgust, he would throw the bottle away out of his own reach and then be distracted until it was given back to him. At other times he would sit with a countenance of the most intense dejection, contemplating the bottled sugar, and then, as if pulling himself together for another effort at solution, would sternly take up the problem afresh and gaze into the bottle. He would tilt it up one way, and try to drink the sugar out of the neck, and then, suddenly reversing it, try to catch the sugar as it fell out at the bottom. Under the impression that he could capture the sugar by surprise, he kept rasping his teeth against the glass in futile bites, and, warming to the pursuit of the revolving lump, used to tie himself into regular knots round the bottle. Fits of the most ludicrous melancholy would alternate with spasms of delight as a new idea seemed to suggest itself, followed by a fresh series of experiments. Nothing availed, however, until one day a light was shed upon the problem by a jar containing bananas falling from the table with a crash, and the fruit rolling about in all directions. His monkeyship contemplated the catastrophe, and reasoned upon it with the intelligence of a Humboldt. Lifting the bottle high in his claws, he brought it down upon the floor with a tremendous noise, smashing the glass into fragments, after which he calmly transferred the sugar to his mouth and munched it with much satisfaction.—Christian Advocate.

The Use of Compressed Air for Raising Water.

By means of compressed air, says the Sanitary Plumber, water can be lifted from a well of any reasonable depth without working parts of any kind being placed in the well. The air may be compressed in suitable reservoirs by any convenient mechanical means—steam, wind power or air expansion. Air can be made to deliver water at a steady and continuous pressure from underground reservoirs placed at any depth desired, and can be made a much more important factor in the work of domestic water service than it has been hitherto. In fact, air pressure is the ideal means of moving water in some instances, and when its capabilities are better understood by the many its superior service will be made available to an extent not even anticipated now. A reservoir placed underground takes up no room in the house, requires no unusual framing in the house to support it, offers no chance of flooding the house and its furnishings, it will not freeze in winter, and it keeps the water cool in the hot months of summer. In warm climates, reservoirs with large surfaces advantageously exposed to the rays of the sun will heat water sufficiently for all domestic purposes and in any required quantities without the aid of a fire. Now, with all these methods to select from, together with the data for erection and operation which manufacturers are always glad to furnish to any one who applies, the veriest novice ought not to fail of obtaining satisfactory results under conditions which would once have been looked upon as extremely difficult, even to an experienced engineer.

Maximum Air Pressures in which Men Can Work.

According to a writer in Cassier's Magazine, the highest working pressures recorded have been close to 50 pounds per square inch; but with extreme care in the selection of men and corresponding care on the part of the men, it is very probable that this limit may be considerably exceeded.

For the average pressure man, under average conditions, the top limit may be placed at about 45 pounds, the time of working varying from 4 to 6 hours per shift, according to conditions. In the cases where higher pressures might be used, the shifts for the men should be restricted to two of 2 hours each separated by a considerable interval. As an example of heavy pressure work under favorable conditions as to ventilation, without very bad effects on the men, Messrs. Sooy-Smith & Company had an experience with a work on which men were engaged in 6 hour shifts, separated into two parts by half hour intervals for lunch. This work was excavation in open, seamy rock, carried on for several weeks under about 45 pounds pressure. The character of the material through which the caisson is being sunk, or upon which it may be resting at any time, bears quite largely upon the ability of the men to stand the pressure necessary to hold back the water at that point. If the material be so porous as to permit a considerable leakage of air through it, there will naturally result a continuous change of air in the working chamber, and a corresponding relief of the men from the deleterious effects which are produced nearly always by over-used air.