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Contents.

(Illustrated articles are marked with an asterisk.)

THE SOVEREIGNS OF INDUSTRY.

During these times of financial depression, when the great industries of the country are languishing and labor is everywhere out of employment, diminished incomes are the rule, and economy the virtue most in demand. To those whose incomes are still liberal, though never so much less than heretofore, the problem of adapting expenditures to receipts is comparatively simple. They have merely to cut off a few luxuries more or less, to pinch their pride a trifle, it may be, but with no risk of trenching on the actual necessaries of life, either for themselves or their families.

For the great mass of working men, however—men whose wages never greatly surpassed the cost of living—the problem is not so simple. To strike off luxuries would help but little, not many luxuries falling to their share even in the best of times. To lessen the amount of their purchases means to eat poorer food, or less of it, wear cheaper clothing and live in poorer houses; in short, to submit to evils, not to practise economy.

The usual door of escape from the ills of poverty, hard work and more of it, is closed by the general stagnation of industry. Men are fortunate if they get any work, at reduced prices at that. How then can they manage to live? There is but one way, and that is by increasing somehow the purchasing power of money, so that the little they now have may go as far as the larger sums they have been used to: a hopeless undertaking, it might seem, for men without capital and with no influence in financial circles: but so it did not seem to the working men of New England, spurred on by that most efficient sharpener of the wits, necessity. The problem was to make two dollars buy as much as three, prices remaining the same. A glance at the conditions of trade will suffice to make plain the efficiency of the means adopted. During the flush times, before the collapse of 1873, money was plentiful, business brisk, and profits large. Consequently the race of middle men multiplied enormously. Between the miller and the mechanic, the price of a barrel of flour increased fifty per cent or more by passing through half a dozen hands, each charging roundly for the nominal and, for the most part, uncalled-for service rendered. In like manner, the cost of nearly every other article of food or clothing was similarly advanced. With high wages and plenty of work, the consumer was able to pay the extra charges; but when the easy times were past, his lessened wages left small margin for the support of go-betweens. The machinery of trade had become so cumbrous and costly that it was a burden rather than a convenience. Its excrescences had to be cut away; and this the working men of the East have set out to do, holding it suicidal as well as foolish to pay half a dozen large profits on each article they buy, when they can be served as well for a single small advance on prime cost. For example: A hundred laborers want each a barrel of flour. By going to the retail grocer they can get such an article as they desire at the rate of ten or twelve dollars a barrel. On the other hand, by clubbing their funds and buying a car load at the mill, the same grades of flour can be got for seven or eight dollars a barrel, transportation and delivery included. So likewise with nearly every other standard article; by jumping the needless middlemen and buying for cash at first hand, the purchasing power of wages may be immensely augmented, without doing injustice to any one.

It is but a short and natural step from temporary combinations for mutual benefit to permanent organization. This step has been taken; and under the somewhat grandiloquent title of "Sovereigns of Industry," the new organization is drawing together the working men of the Eastern States with a rapidity rivaling the development of the Grange throughout the West.

Thus far the Sovereigns have stuck to their original idea of mutual helpfulness in supplying the necessaries of life to the members of their several councils. It is to be hoped that they will continue to do so, avoiding strenuously the political follies of the Grangers. It would be a pity if the power which the order is capable of wielding for the economical advancement of the great army of manual and mechanical workers of the country should not be developed to the uttermost, as it can be only by the most stringent repression of demagogues and party schemers.

Various plans of operation are adopted by different councils, according to the number of members, their place of residence, and the local advantages for buying. The chief object being to make the most of the money they have to spend, with the least inconvenience or risk, it is a common practice to avail themselves of the machinery of trade already established in their neighborhood, taking care, however, to pay no exorbitant profits. An arrangement is made with one or more dealers in each department to throw the trade of the council into their hands in consideration of a special discount on regular retail prices, a concession which the favored dealers can well afford to make in return for an assured cash custom, without the cost of advertising or other outlays for attracting customers. Every three months the council receives the bids of dealers desiring its trade, and elects those which offer the greatest inducements, all things considered. Tickets of membership are then issued, the exhibition of which entitles the bearer to the stipulated discount on all goods purchased during the ensuing quarter. In all cases the council takes pains to secure trade circulars and lists of wholesale prices current, from which to estimate the justness of the charges of their local dealers. If the members can do better by ordering their supplies from the producer or the wholesale dealer, the local dealers lose their trade altogether.

In many cases large dealers undertake to fill the orders of councils at a slight advance on wholesale rates, delivering to the appointed purchasing agents the articles in separate parcels as required by the members, thus enabling the mechanics of the most out of the way village to command as favorable terms as the market will afford. Where the purchases are considerable and tolerably regular, it has been found a very satisfactory way to hire a cheap store room, and appoint one of the members storekeeper for the council, to distribute the purchases as called for, on certain evenings of the week. At the regular monthly meetings, the members elect the amounts of the several articles required, which are purchased in bulk, and of course on more favorable terms than in separate parcels. By this plan, most of the advantages of co-operative stores are secured, with none of the risks.

In several States, it has been found advantageous (experimentally, at least) to mass the trade of the order, or a great portion of it, by appointing a general purchasing agent, through whom the supplies for the councils are ordered, the superior advantages of such a buyer more than offsetting the cost of the increased machinery.

An idea of the rapid spread of the organization may be gained by the rate at which the order has grown in Connecticut. The first council, with seven members, was organized February 26, 1874. In May a State council met, with a membership of twelve hundred. By August, this number was more than doubled; and at the meeting of December 8, forty-seven councils, with a membership of over five thousand, were represented. To-day, there are probably near ten thousand of the more thrifty mechanics and laborers of the small State of Connecticut thus banded together for mutual benefit in trade. Thus far, the estimated saving to each member is thirty per cent of his purchases through the agency of the order—certainly an amount worth considering. Such a sensible and practical "strike" for increase of wages is something new in the annals of industry.

Besides the State councils, a national council has been organized. It will hold its session for 1875, probably before this reaches the eye of the reader. For what practical purposes the session will be held does not clearly appear to outsiders. We can only hope that it will take no action to complicate the objects of the order, or to divert its work from its original purpose. National councils are apt to be over ambitious, and the temptation to use a popular organization for political purposes is hard to be resisted: if indulged in, ruin is inevitable.

A BOX TRICK TO BEAT HARTZ.'

According to travelers' stories—the best of all evidence, as everybody knows—there used to be in India a school of vagabonds who got their living by dying. For a very modest sum they would emulate the frogs which are periodically discovered alive in solid rock—or in tree trunks, overlaid by innumerable rings of annual growth—and retire for a specified period from the cares of this life. They professed to have such control over their vital processes as to be able to die at will, and would allow themselves to be sealed up in coffins or tied up in blankets, and buried underground for a week or a month, or more.

A very circumstantial account of such an operation was given by Sir Claude Wade. When he was at the court of Runjeet Singh, in 1837, a fakir was thus buried for six weeks, a company of soldiers guarding the place of his interment to prevent untimely resurrection. At the end of the six weeks the seals were found intact; and on removing the lid of the box which served as a coffin, the white linen bag in which the fakir had been placed was found to be mildewed. When the bag was opened, the temporarily dead man's arms and legs were found to be shriveled and stiff; and his head reclined, corpse-like, on his shoulder. To all appearance he was as dead as an Egyptian mummy, no pulsation or other evidence of life being discoverable. He was then turned over to the manipulations of his servant, who made warm applications of various kinds, whereupon the arms and legs gradually returned to their normal state. He then removed the wax and cotton with which the fakir's nostrils and ears had been closed, and after half an hour the devotee was able to speak. All of which Sir Claude vouches for as an eye witness, with an air of truthfulness rivaling that of About's clever story of the man with the broken ear.

This art of dying at will and coming to life again appears not to be monopolized by the Hindoos. At least one Englishman in modern times, if human testimony is worth anything, has attained it. His name was Townsend, Colonel Townsend of the British army in India. This man could go into a death-like trance at will, so skillfully counterfeiting real death that the most critical observers were deceived. On one occasion the experiment was made in the presence of Dr. Cheyne, who reports upon the case, Dr. Baynard and a Mr. Skrine. All three felt his pulse: it was distinct, though small and thready: and his heart had its usual beating. He then composed himself on his back and lay motionless for some time. Gradually all signs of life disappeared, till there was no pulse, no beating of the heart, and a mirror held before his mouth gave no indication of breath.

The witnesses discussed this strange appearance for a long time, finally concluding that he had carried the experiment too far and was really dead. As they were about to leave him, a slight motion of his body was observed, and a beating of the heart. In a little while he began to breathe, and gradually life was fully restored.

This account has been accepted as trustworthy and credible by high medical authorities, and so likewise have those given of the fakirs who carried the experiment a degree further than Colonel Townsend, and submitted themselves to actual burial.

It is a pity the art has not been more widely cultivated; it would afford such a convenient refuge for geniuses born ahead of their time. On finding their generation too stupid to appreciate their grand discoveries and projects, they could retire for a season until in the regular course of events the masses should overtake them. Then instead of writing a book and depositing it, sealed, in a public library, to be opened in the year 1975, or such a matter, they could themselves be so deposited, duly labeled and preserved, till their time should come. We could name a good many whose acquaintances would gladly provide fireproof quarters for them and their projects for a century or two. The only fear that the fakirs had of protracted burial was that in the meantime their servants might die and there be left no one to resurrect them. In cases such as we have imagined, there would be no risk of this sort to deter the devotee, the community at large assuming the responsibility.

TESTING THE CORRECTNESS OF FIGURES BY WEIGHT.

We publish in another column a communication from our well known correspondent Dr. P. H. Vander Weyde, in which he suggests a rather novel and effectual method of testing the correctness of all calculations such as those pertaining to the squaring of the circle, and the contents of circular or other forms. His method is based on the practice, adopted sometime ago, of measuring the area of land by weight, in which the figure of the land is drawn to a scale on paper, and the figure cut out of the sheet. The figure of a square acre is also drawn to the same scale and cut from the paper sheet. The two are now weighed separately. The weight of the paper figure of the land, divided by the weight of the paper figure of the square acre, indicates with accuracy the number of acres contained in the land.

Applying this method to the squaring of the circle, Dr. Vander Weyde weighed the circle of paper and the proper squares, with the results given in his letter. It will be seen that the calculations of some of our prominent circle squarers, when thus weighed in the balance, are found wanting.

P'I-RYI.

Among the ways that are dark and tricks that are queer, for which the "heathen chinee" is peculiar, one of the cleverest bears the name p'i ryi. It fairly rivals the jugglery of our highly enlightened writing mediums, and is employed for the same useful purpose. When the pig-tailed earnest enquirer realizes the truth which the Widow Bedott versifies:

> "Poor short-sighted critters, we
> Kant calculate what's going to be
> And, like enough, never'll take place:"

he consults an oracle, much as pig-headed enquirers do with

us. The oracle does not put a slate under a table to be written on; he writes on the top of a table, previously dusted with sand or flour. The pen—that is to say the brush, for no other sort of pen or pencil is used in writing Chinese—is suspended by a string from the rim of an inverted wicker rice basket, which is balanced on the fingers of two persons sitting on opposite sides of the table. After the proper period of quiet waiting, the pen begins to move, writing out the answer to any question which may be put.

On one occasion, the Chinese teacher of the Rev. R. H. Cobbold, who is responsible for the story, consulted an oracle of this sort to discover certain names that were wanting to fill up an ancestral register. On being asked for a particular name, the oracle wrote: "Inquire of another branch of the family." It was done, and the "spirit" at once wrote down the name. The story reminds one of a great deal that passes for evidence outside of China, there being no proof that the names furnished by the "spirit" were correct. It is not surprising that the investigations made by the reverend gentleman were unable to discover the cheat.

Writing of p'i-kyi, in his chapters on China and the Chinese, the Rev. A. E. Moule says: "So great is the mystery, or, if you please, so clever is the trick, that some of the oldest and most wide-awake of the missionaries have been quite unable to explain it away, even when performed under their own eyes and on their own study tables." The chief difficulty seems to be the apparent impossibility of directing by muscular effort the formation of intricate Chinese characters by means of a pen suspended by a string.

LOSS OF A LARGE NEW YORK MAIL.

On the 7th of January the express train that left Washington for New York at 9.30 P. M., in consequence of a misplaced switch, went into collision with a freight train standing on a side track. One man was killed, and another badly injured. The coal oil in the lamps of the postal car was scattered and instantly burst into flames, soon destroying the mails and the contents of the adjoining express car. The mails lost were large, comprising upwards of one hundred thousand letters from the South, bound for New York and other places. The usual daily correspondence of the SCIENTIFIC AMERICAN office was consumed, and a large number of our correspondents will consequently fail to receive their expected replies. We hope they will promptly repeat their enquiries.

IMPROVEMENT IN CANAL NAVIGATION.

It will be remembered that some three years ago the State of New York offered a reward of one hundred thousand dollars for the invention of improved methods of navigating the Erie canal (400 miles in length), whereby merchandize could be transported with greater economy than by the present system of horse towage. A variety of experimental boats were made, all or nearly all propelled by steam. The ultimate result was that none of the competitors succeeded in complying with the peculiar conditions of the law, and they were finally modified, and under the modification an award was last year paid to the owner of the Baxter boat and to one other competitor. So ended the State reward project. But there is still a strong demand for improvement, and the subject is well worthy the attention of ingenious minds.

General Thayer, Canal Auditor of this State, takes up the subject in his recent report, and gives expression to the following eminently practical views:

"The Baxter Steam Canal Boat Company has been organized, and during the past season has constructed and operated seven boats, which, according to reports furnished this department, have proved successful, both in regard to increased speed and greater economy, as compared with boats moved by animal power. This company is really the first organized to employ steam as a motive power on a scale likely to prove a financial success. There can be no doubt that an organization with a sufficient number of steamers to ensure daily departures, and with convenient wharfage facilities at New York, will command business at remunerative rates. Such an enterprise can secure a large and profitable traffic in both directions on the line of the Erie canal, which of late years has been almost entirely abandoned to the railroad.

A PLAN FOR TOWAGE WANTED.

"One great need, however, has not yet been accomplished, that is, some plan for steam towage or propulsion adapted to the large number of boats now employed, five thousand to six thousand, and moved by animal power.

"Although I do not disapprove of the liberal bounty which the legislature granted to the Baxter boat, still, without intending in the least degree to disparage the merits of that boat, I am inclined to believe that, if the same liberal reward had been open to wider competition, we might possibly have secured a better result. When the law required that the motor should be adapted to the form of boat then in use, that restriction virtually prevented practical mechanical engineers from engaging in the contest. They knew that, as Mr. Baxter fully realized, a boat to be propelled by its own machinery must be of a different form and model from those that were simply towed, and hence were unwilling to assume the risk of being recognized by the commission or rewarded by the State when not adhering to the requirements of the law. Had the time for competition been extended, the mechanical genius of the country would have been enlisted; a greater number of plans would have been submitted, and might not the practical results have been more favorable?

SUCCESS OF CABLE TOWAGE

"The New York Steam Cable Towing Company was organized for the purpose of introducing upon our canals the cable system of towing. That company, during the season of 1872, laid a single cable between Buffalo and Lockport, and, with two steamers especially constructed for the purpose, has been operating the system, experimentally, during the past two seasons. It is claimed by the projecters of the enterprise that, during their experimental operations, 1,400 tuns of freight, with boats containing it, have been hauled in one train by a single cable steamer, against the strong current between Tonawanda and Buffalo, at the rate of three miles per hour, at as low a cost for steam power as any known steam canal boat carrying two hundred tuns, that is to say, doing seven times the work at the same cost for steam. The cable system ought not to be considered an experiment. It has been in successful operation on European canals and rivers for several years, and found to be the cheapest adaptation of steam for towing purposes yet devised. There is no reason why it should not be equally successful on our own canals, and certainly no more profitable field for the operation of the system can be found.

FURTHER IMPROVEMENTS DEMANDED.

"Before dismissing the subject, I cannot refrain from reminding the legislature that the State has made but one earnest effort to introduce steam on our canals. That effort should be continued, and not relaxed until success is assured. With steam successfully established on our canals, we shall command, without fear of diversion, our full share of western trade. The Lyons lock will be finished before the opening of navigation the coming spring. The completion of that structure will give us double locks the entire length of the Erie canal. Cheap and rapid transportation is the great problem of the day, and its solution interests producer and consumer alike. Railroads reaching from nearly all the principal cities upon the Atlantic coast to the great grain markets of the West are striving for supremacy in the carrying trade, and it is quite probable that active competition will have the effect to reduce rates, for a time at least, to a point below actual cost. But with our great lakes, on which a single vessel of modern build will carry one hundred thousand bushels of grain (equal to 300 car loads) from Chicago or Milwaukee to Buffalo, and with the Erie canal in good order, seven feet of water and double locks, together with steamboats and steam towage on the canal and river, through from Buffalo to New York, alongside of ship in five to six days, we can successfully compete with all the railroads in the country, even at the present rates of toll."

AMALGAM FILLINGS FOR THE TEETH.

We are indebted to Dr. J. W. Clowes for a copy of his very excellent essay on the above subject, as read before the Odontological Society of this city. Dr. Clowes has rendered a good service to the dental profession by his long-continued, sturdy support and practice of tin amalgam fillings. He has in times past been ridiculed for this by members of his own profession; but at last it begins to be perceived that, instead of ridicule, he was entitled to honor.

The use of tin amalgams as a filling for the teeth was begun many years ago, but the practice never became general among dentists. This was due to early prejudices against the material, engendered by lack of knowledge and skill in its use. Its employment is, however, being now judiciously revived.

The experience of some of our best dentists, throughout a period of thirty years, has conclusively shown that tin amalgam, properly prepared and applied, is a reliable preservative; while owing to the plastic nature of the amalgam, it may be inserted within sensitive or delicate teeth without pain to the patient, and under circumstances when the use of gold would be inadmissible. This amalgam when first applied is quite soft, and a gentle pressure therefore causes it to fill every interstice of the tooth with certainty. After a few hours' time the amalgam becomes permanently solid.

Complaint has been made that the tin amalgam fillings turn black and cause the teeth to decay. But this is not the case to any greater extent than when gold is used. Some of the worst looking and most badly decayed teeth we ever saw have been those filled with gold by a poor operator. The truth is that, if the dentist is an unskilled man, or if you neglect to keep your teeth scrupulously clean, they will decay and discolor, no matter what fillings are used.

When the decayed cavity in a tooth is properly excavated and filled with amalgam, it will preserve the tooth with certainty; while in general, it looks better in the mouth than gold. Dentists skilled in the use of the amalgam, and patients carrying this filling, will testify to the correctness of this statement.

Next to the breathing of pure air, exercise, and the use of suitable food, nothing more contributes to the preservation of health than the possession of good teeth. All the arts used for their preservation are therefore of the highest importance.

It should never be forgotten that the teeth will not ordinarily decay, either originally or after being properly filled, unless food or other foreign substances are allowed to remain between them long enough to acidify or decay, and thus act injuriously on the dental enamel. The importance of keeping the teeth clean, by brushing, by drawing silk threads between, by frequent rinsing, and other simple agencies, may thus be understood.

Captain E. B. Ward.

We note with regret the death of Captain Eben B. Ward, a well known citizen of Detroit, whose name for many years past has been closely identified with the remarkable growth and progress of our Northwestern industries. Mr. Ward was born in Canada, in 1811, and at the early age of 12 years was rendered dependent upon his own exertions for support. Entering upon the duties of cabin boy on a lake schooner, he speedily rose to command the largest vessels, and ultimately became himself an owner of a great number.

During late years Mr. Ward gradually withdrew from shipping interests, and devoted his talents and capital to the establishment of iron manufactures in his section of the country. He founded the Eureka Iron Works of Detroit, the North Chicago rolling mill, and the rolling mill at Milwaukee. He also made large investments in the Lake Superior iron mines and erected furnaces in the vicinity. He was for many years President of the American Iron and Steel Association, and, in this as well as in other prominent positions, labored to push forward the important industrial enterprises which he had initiated. Pecuniarily his ventures were highly successful, and he leaves an estate estimated at several million dollars. Mr. Ward's death was very sudden, owing to an apoplectic stroke, and occurred on the morning of January 2.

SCIENTIFIC AND PRACTICAL INFORMATION.

A NOVEL SINGLE RAIL RAILWAY.

The Turkish government has recently commenced the construction of a railway, termed the Steam Caravan, between Alexandretta and Aleppo, Syria, a distance of 94·2 miles. A single rail is employed, following the conformation of the land, but raised on a wall 28 inches high and 17·5 inches broad. The vehicles are mounted and straddle, so to speak, both rail and wall. The locomotives are provided below with horizontal, leather-covered wheels, which rest against the sides of the masonry and serve as brakes, and the last vehicle of each train has similar arrangements. Each side of each carriage contains two persons, and the complete train is calculated to accommodate ninety-six.

A NEW WAY OF PRESERVING EGGS.

It is stated by the *Revue Industrielle* that the best method of preserving eggs is to soak them for half an hour in soluble glass of a thick, pasty consistency. The material forms a chemical compound with the carbonate of lime of which the shell is composed, which renders the latter impermeable to air. After immersion, the eggs should be carefully dried and kept in oats or on perforated trays in a dry locality.

SCARLATINA AN EPIDEMIC.

The views of Dr. Alfred Carpenter, published some three years since in the *Lancet*, upon the subject of scarlet fever, ascribing to that disease an epidemic character, are strongly endorsed in a recent issue of the *Medical and Surgical Reporter*. The editor maintains that not only is the disease infectious in the full sense of the term, but also that the malignity of the infection is something frightful. Articles of clothing worn by patients retain a dangerous character for over a year, as do walls, furniture, and in fact everything that has been in the vicinity of the disease and in its spread. The secretions of the body, epidermic scales, and excreta are active carriers of the pestilence.

Thorough ventilation and disinfection are the best means for destroying the poison. Clothing, bedding, etc., should be submitted to a dry heat of 220° Fah. for several hours, and then soaked in a mixture of 1 pound hyposulphite of soda, 2 ounces sulphuric acid, and 8 gallons of water. Rooms should be purified by burning sulphur, and the patient thoroughly cleansed before having intercourse with other people.

VENUS AS A LUMINOUS RING.

Professor C. S. Lyman published in the *American Journal* eight years ago a brief notice of some observations made on Venus when near her inferior conjunction in 1866. The planet was then (for the first time, so far as appears) seen as a very delicate luminous ring.

No opportunity has since occurred of repeating these observations until the day of the recent transit. On Tuesday, December 8, Venus was again in close proximity to the sun, and the author had the satisfaction of watching the delicate, silvery ring enclosing her disk, even when the planet was only the sun's semi-diameter from his limb. This was at 4 P. M. or less than five hours before the beginning of the transit. The ring was brightest on the side toward the sun—the crescent proper. On the opposite side the thread of light was duller and of a slightly yellowish tinge. On the northern limb of the planet, some 60° or 80° from the point opposite the sun, the ring for a small space was fainter, and apparently narrower, than elsewhere. A similar appearance, but more marked, was observed on the same limb, in 1866.

These observations were made with a five foot Clark telescope of 4¾ inches aperture, by so placing the instrument as to have the sun cut off by a distant building while the planet was still visible. The ring was distinctly seen when the aperture was reduced to 1¼ inches. The 9 inch equatorial could not be used, as there were no means of excluding the direct sunlight.

On the 10th the crescent, extending to more than three fourths of a circle, was seen with beautiful distinctness in the equatorial; and on this and two subsequent days, measurements were taken with the filar micrometer for the purpose of determining the extent of the cusps, and consequently the horizontal refraction of the atmosphere of the planet, on the assumption that the extension of the crescent and formation of the ring are due to this refraction.

VARNISH FOR WHITE WOODS.—Dissolve three pounds of bleached shellac in one gallon of spirit of wine; strain, and add one and one half more gallons of spirit. If the shellac is pure and white, this will make a beautifully clear covering for white wooden articles.

Cocoa nut husk is better than cotton waste and turpentine for taking temporary rust from iron or steel.