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Contents:

(Illustrations are indicated by an asterisk.)

*Lyman's Air Purifier.....	367	Smoke-consuming Stove.....	373
Steel Pens.....	368	Challenge Accepted.....	373
Independence vs. Impudence.....	368	Brass in a Petroleum Lamp	
Latest Foreign Intelligence.....	369	Flame.....	373
The Best Substance for Mak-		To Weld Cast Steel.....	373
ing Cloth and Leather.....	369	Preventive for Boiler Incrus-	
Water-proof.....	369	tation.....	273
New Silver Salt.....	369	Faults in Wood-Working Tools	
Water-proof Goods.....	370	Quartz Crusher and Pulverizer	
The Progress Machine Works.....	370	Spiral Blower.....	373
New Photographic Processes.....	370	*Emerson's Saw Tooth.....	374
New Photographic Developer.....	370	Raising of a Wreck.....	374
Recent American Patents.....	371	Improved Urrent Water.....	374
Various Obstacles to the Es-		Whseel.....	374
tablishment of the Tele-		Magnesium.....	374
graph in India.....	371	Reynolds's Bag Holder.....	374
Condensed Correspondence.....	371	The Difference Between New	
Objection to Iron Cars—Im-		and Old Ales.....	376
mense Coal Traffic.....	371	Acquiring Information.....	376
Notes and Queries.....	372	Inventor's Associations and	
Market for the Month.....	372	the Patent Laws.....	375
The Way to Prevent Boiler In-		An Excursion to the Coal	
crustations.....	372	Fields.....	37
The Algonquin and Winoski		Patent Claims.....	376, 377, 378, 379
Trial.....	372	*Barnard's Sheep-feeding Rack	
Effects of Pure Air.....	372	A Large Organ.....	382
A Woman's Question.....	372	Oxygen Gas.....	382

THE DIFFERENCE BETWEEN NEW AND OLD ALE.

Ale may be strong in two ways—in hops and in alcohol. Ale is simply water, with the addition of a very small proportion of alcohol and a still smaller proportion of the extract of hops. The bitterness is imparted by the hops—the stimulating and intoxicating properties by the alcohol.

When ale grows sour with age, the sourness results from the change of alcohol into vinegar; the beverage is, therefore, weakened in proportion as it becomes sour—the alcohol being destroyed in the production of vinegar. If the process is completed, the liquid becomes water, vinegar, and the extract of hops.

Ale may be kept, however, for a long time, without becoming sour; and when not made sour by keeping, its strength is not impaired. Both vinegar and alcohol are composed of carbon, hydrogen, and oxygen, but vinegar contains a larger proportion of oxygen than alcohol. Alcohol, therefore, cannot be converted into vinegar without a supply of oxygen. Water, which is the principal ingredient in ale, is nearly all oxygen, but alcohol has not the power of decomposing water, and appropriating its oxygen, a supply, therefore, in order for the conversion to take place, must come from some other source. This source is usually the atmosphere, one-fifth part of which, by volume, is pure oxygen. Besides the oxygen which water contains as its largest constituent element, it absorbs other oxygen from the atmosphere, and holds it, in a free or uncombined state, in solution. It is this free oxygen which enters into chemical combination with alcohol when that liquid is converted into vinegar. As the quantity thus absorbed is small, the conversion soon ceases, unless the ale can absorb further quantities from the atmosphere. The simple plan, therefore, for preventing ale from becoming sour and weak is to inclose it in air-tight vessels. A large proportion of alcohol also checks the ascetic fermentation, consequently strong ales keep better than those that are weak.

When bottled in the proper stage of fermentation, ale is not only preserved in strength and flavor, but its effervescence is increased. The foam of ale is formed of innumerable globules of carbonic acid gas, each inclosed in a minute film of the slightly viscid liquid. In the fermentation of barley or other grain, the starch, which is the largest constituent of the grain, is changed first into sugar, and then the sugar

is changed into alcohol and carbonic acid. To make ale very foaming it is bottled before the vinous fermentation is quite completed, and then it becomes saturated with a large quantity of carbonic acid.

Hops are put into ale to give it a bitter taste, and they are also supposed to possess narcotic and anodyne properties; but there is a difference of opinion on this point. Wagner and Bibra made a series of experiments on the lower animals with the oil of hops, and came to the conclusion that it had no narcotic properties.

ACQUIRING INFORMATION.

Many persons, whose opportunities for information have been few, appreciate late in life the advantages of education, and endeavor to acquire information of a useful character by a course of study.

Mechanics who have felt the need of more precise and thorough knowledge of arithmetic or other branch of mathematics; manufacturers, who wish to be grounded in the rudiments, at least, of chemistry; shopmen who wish to become bookkeepers; men of these and other callings often conceive and carry out the laudable object of learning something in the long winter evenings, that shall be of lasting benefit.

Too often, however, all their efforts are wasted by beginning it properly. In order to render time spent in study useful, some system must be pursued, so that instead of receiving a mere general impression of any process, or science, the student will have a clear and thorough knowledge of it, and so be able to suggest improvement or perceive defects.

It often happens that valuable inventions are made in this way by men who are not members of the profession or line of business to which their discovery belongs. Instead, therefore, of having a mere smattering of many subjects, it is far better to be able to talk rationally on one. Ignorance of all things, in these days of printing presses, is justly held in contempt; but if a man knows something thoroughly, no one can accuse him of ignorance. The grand mistake most persons make, in taking up any branch of study, is in trying to learn too much at once.

Instead of setting down soberly to work, and reading one chapter or one page, even, it is common for many to rush through a work, reading at random. The consequence is that they have no knowledge of the matter, and feel that they have not; for when, afterward, they attempt to recall some of it, they realize the effects of desultory reading.

It is, moreover, very discouraging to find memory so treacherous, for the student imagines that he has some mental defects which prevents him from acquiring knowledge as other men, when the fault is not of this nature, but one of method.

Men who work at trades experience difficulty in settling their minds to habits of study at first, just as those whose fingers are stiffened by clapping a hammer find their joints are not so flexible as a writing master's. But by practice and discipline mental dexterity comes as surely as manual skill.

Let no one feel disheartened if, at the outset, he finds his mind a blank after an evening's study. Stick to the task, and read the chapter over again until it is mastered, but do not expect to plunge at a bound into the mysteries of mathematics, or chemistry, or other laws governing the action of the imponderable agents—such as light, heat, electricity, and others. Be content with moderate but sure gains, and there will be no disappointing, but certain reward.

INVENTOR'S ASSOCIATIONS AND THE PATENT LAWS.

All life is a battle. Malthus pointed out the truth that the human race is constantly pressing on the means of subsistence so vigorously that only a favored few live out half their days; Darwin has shown that the same struggle for existence is going on throughout the whole animal creation; and Carlyle, in his shadowy and extravagant style, failed to express the truth that he perceived, by the remark, "The very hyssop on the wall grows there because the whole universe can not prevent it." Even with all the appliances of modern mechanism, more than three-quarters of mankind are obliged to pass through life with a large portion of their wants unsatisfied. Though the production of wealth is a hundred-fold

greater than in any previous age of the world; it is still far short of the desire for wealth. In this state of affairs, it is not strange that every one is struggling to get as large a share as possible of the limited product.

All men place an exaggerated estimate upon their own abilities and services. Punch, with correct knowledge of human nature, asks, "Did you ever know a man who was satisfied with his position, or dissatisfied with his talents?" If the wealth that is produced in the world should be distributed arbitrarily by any human tribunal—however exalted in intelligence and virtue, and however highly respected—every one would feel that he had received less than his rightful proportion, and all would complain of the injustice of the distribution. On the other hand, when every man is left free to get all the property that he can by the employment of his own faculties, though he may feel that he has less than his due share, there is no human tribunal responsible for the distribution that he can reproach with injustice. He submits to the evil as an irresistible decree of Providence; or, if his judgment be enlightened and just, as the natural consequence of his own conduct. The smallness of his share he may regard as a grief, but not as a grievance.

The most admirable feature of the patent laws is, that in their rewards for inventions they conform to the laws of nature. They give the inventor the exclusive right to his invention for a limited period, and then they leave him to get out of it all he can. If the invention is valuable, and he knows how to manage it, he makes a fortune out of it. If it is equally valuable, and he does not know how to manage it, he makes nothing out of it. In this case, however, he has no one to blame but himself.

If a number of inventors should put all their inventions into a joint-stock association, with the understanding that the gross proceeds should be distributed fairly among them, it requires no profound knowledge of human nature to perceive that the distribution would be unsatisfactory to all the members. Each one would consider himself the greatest genius in the company, and his invention the most valuable invention of any. As a general rule, the more stupid the inventor, and the more worthless his plans, the more lofty would be his estimate of both. Associations are admirable things when organized in accordance with common sense, but an association of inventors like this would be doomed to a squabbling and brief career. Inventors, being usually sensible men, rarely ever get entangled in such associations.

AN EXCURSION TO THE COAL FIELDS.

A very pleasant excursion over the Reading and Lehigh Valley Railroads was enjoyed by a party of about thirty gentlemen during the past week. It continued four days, and was an occasion which all the participants must ever remember with pleasure.

The entertainment provided throughout the excursion was a continual feast. The exhaustless coal fields and iron beds of the Schuylkill and Lehigh Valleys, through which the party traversed, afforded a fine opportunity to witness the wonderful mining operations carried on in those regions of Pennsylvania. To C. E. Smith, Esq., President of the Reading Railroad, and Mr. Langstreth, of the Lehigh Valley Railroad, the excursionists were under special obligations for courteous attentions.

Among the most prominent guests were Hon. John Sherman, of Ohio, chairman of the Senate Finance Committee; David A. Wells, of New York City, and Stephen Caldwell, of Philadelphia, members of the Revenue Commission; General Simon Cameron, ex-Secretary of War; and John Tucker, late Assistant Secretary of War; T. W. Olcott, of Albany; Morton McMichael, proprietor of the North American and Mayor-elect of Philadelphia; Moses Taylor, of New York; Judge Strong, of Reading; Dawson Coleman, of Lebanon, and about twenty other prominent business and literary men from New York and Philadelphia, many of whom have large pecuniary interests in the coal and iron mining districts through which they passed.

On some future occasion we hope to have time and space to tell our readers some things we saw at the coal fields, in the furnaces, rolling mills, machine shops, and zinc works which we visited during this excursion.