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Contents:

(Illustrations are indicated by an asterisk.)

*Fay's Combined Screw Lathe and Milling Machine.....	335	Exhibition Hall at the Patent Office—Important to Manufacturers.....	340
Portable Furnace for Casting Large Anvil Blocks.....	335	Smoke Consuming Stoves.....	341
Notes on New Discoveries and New Applications of Science.....	336	Patent-law Trials—Extraordinary Endurance of a Steel Ship.....	341
Discoveries in Boiler Explosions.....	336	Ventilation.....	341
Resin in Lard.....	336	Headless Screws for Boots.....	341
Curious Effects of an Earthquake.....	336	To Our Advertising Patrons.....	341
Recent American Patents.....	337	*Ferguson's Oil Cup.....	342
Interesting Patent-law Trials.....	337	Jordan & Smith's Screw Wrench.....	342
Seeing Through Water.....	337	Russian Railroad Cars.....	342
Absorption of Heat by Vapors and Odors.....	338	Books for Mechanics.....	342
The Great Lakes to be Connected with the Mississippi.....	338	*King & Smith's Washer Cutter.....	342
*Hendrickson's Chimney Top.....	338	Burning Smoke.....	343
For Inventors and Mechanics.....	338	English Inventors—Co-operative Society.....	343
Latest Foreign Intelligence.....	338	The <i>Algonquin</i> and <i>Winooski</i> Trial.....	343
The <i>Winooski</i> and <i>Algonquin</i> —Official Report of the Results of the Trial.....	339	Political Economy in a Nutshell.....	343
Scheme to Tunnel the Chicago River.....	339	Petroleum for Fuel.....	343
Notes and Queries.....	340	Patent Claims.....	344, 345, 346
Fire-proof Paint for Bridges.....	340	*Powell's Improved Gaiter.....	346
The Pitch of Gears.....	340	American Torpedoes in England.....	350
		A Good Washing Machine.....	350
		*Broadhead's Boring Tool.....	350

TO OUR READERS ON THE PACIFIC COAST.

The SCIENTIFIC AMERICAN has now a large and increasing subscription list in California, Oregon, and other Pacific States. Our professional business in those States is also increasing, which clearly indicates a healthy progress in the manufacturing and mechanic arts.

We now desire to thank our patrons and friends upon the Pacific coast for their generous encouragement, and also to remind them that a new volume of the SCIENTIFIC AMERICAN will commence January 1, 1866, at which time there are a large number of subscriptions that will expire. We make the announcement at this early date for the purpose of securing the co-operation of our friends in getting up clubs for the next volume.

Notwithstanding the increasing cost of paper, we have determined to offer the SCIENTIFIC AMERICAN in clubs of ten and upward for \$2 50 per year, at which rate we hope to largely increase our circulation.

Of the future value of the SCIENTIFIC AMERICAN the past twenty years must be our guaranty. No other journal of the kind in this country, or Europe, can compare with it in the extent and value of the information which its columns supply.

Send in your clubs and subscriptions early, in order to secure the first numbers of the new volume.

BURNING SMOKE.

In Pittsburgh, Cincinnati, and other cities west of the Alleghanies, where bituminous coal is generally used for fuel, the smoke that constantly fills the atmosphere is a very great nuisance. It hangs as a dark cloud in the air; it settles as a sooty deposit upon the carpets, the furniture, the dishes, and all parts of the houses; it fills the clothing and clogs the lungs of the inhabitants. This smoke is unburned fuel—minute particles of carbon floating away in the atmosphere. In England the same evil has been experienced, and great efforts have been made to overcome it—more than a hundred patents having been taken out for different plans of burning smoke. Some of these applied to the furnaces of

steam boilers are completely effectual, but we are not aware that any practical plan for burning the smoke of fires for heating dwellings has yet been devised; and, as the quantity of coal burned in houses is several times greater than that used in manufactories, this application is more important than the other.

The principles of the problem are very simple—the whole difficulty is in their practical application. The elements in bituminous coal which burn are carbon and hydrogen, and the burning is the combination of these with the oxygen of the atmosphere. The hydrogen in combining with oxygen produces pure water, and the carbon in combining with oxygen forms either carbonic acid or carbonic oxide, and both of these are gases as clean and invisible as the air we breathe. When smoke is formed it results from the fact that a portion of the carbon does not combine with oxygen—in other words, is not burned.

The reason why a portion of the carbon passes off unconsumed is that it is scattered and cooled before it comes in contact with the air. Carbon and hydrogen combine with oxygen only at high temperatures, and in ordinary burning, the heat generated by the combustion of one particle raises the temperature of the adjoining particles to the degree at which combination takes place. Bituminous coal in burning is generally decomposed by the heat before it is burned, and in the decomposition, carbonic oxide, ammonia, and several hydrocarbons are produced, which expand to the gaseous form, scattering minute portions of carbon and cooling them below the combustion point before they come in contact with the air. What is wanted, therefore, to effect the combustion of smoke, is either to concentrate it, so that the burning of one particle will heat the adjacent particles to the combustion temperature, or else to bring it in contact with very hot air.

One of the successful plans for burning smoke in the furnaces of steam boilers is that patented in England by Charles Wye Williams. The flame and gases resulting from the partial combustion and decomposition of the coal are carried over a bridge wall into a chamber behind the grate, and are here mixed with a fresh supply of air, which is introduced through a number of small holes made in the front plate of the chamber. The situation of the chamber causes the smoke to be maintained at a sufficiently high temperature to effect combustion.

In Siemens's furnace, also, the smoke is completely consumed. In this the coal is decomposed by a dull fire, supported by a limited supply of air, and the gases and smoke resulting are carried through a cellular mass of brick work, which has been previously raised to a white heat, into a chamber where they are mixed with air that has been similarly heated.

Some cheap, simple, and practical plan for burning the smoke in ordinary house grates would be an invention of incalculable value.

ENGLISH INVENTORS—CO-OPERATIVE SOCIETY.

A new company or association has been formed in London called "The Household Patents Company," with the object of bringing out inventions promising to improve the art of housekeeping, and relieve persons who do it of a portion of the drudgery.

The Company also undertakes the manufacture and sale of articles chiefly of domestic use, and mostly protected by patents, and will comprise within its operations improvements in the construction of dwellings, and in their lighting, ventilation, and drainage, the preparation of all descriptions of food, the manufacture and economical use of fuel, and the most recent improvements in kitchen and other household furniture.

It has also secured the exclusive right to a new system of preparing American and Australian beef and mutton, so that it becomes as easily cooked and as palatable as fresh meat; to a portable roasting oven which will economize half the fuel now used; to an improved portable Rumford boiler adapted for the army, navy, and private use, and to a newly-invented stone stewpan, and a cooking range. By a preparation invented by Mr. Warriner, instructor of cookery to the army, boxes of beef and mutton, without bone, will be sold at a low rate, at the same time leaving a large profit to the company, so as to mitigate the impending distress among the poor in the winter season.

These are praiseworthy intentions. It has not been made public, how the large profit to the Company will "mitigate the impending distress among the poor," but this is no doubt secured by Letters Patent also, and is peculiar to the inventors.

The capital of the Company is to be \$500,000, in 50,000 shares at \$10 each, and the names of several English gentlemen of local celebrity are published as the managers and vouchers. We do not know how many shares have been taken, as Ryland's London *Trade Circular*, from which we copy this announcement, has not revealed the amount; but the Company are bent on vigorous prosecution of their ends, and, if harmony can be secured among the inventors, the scheme will doubtless be successful.

If rival inventors of the same thing on different plans disagree about prices, or if suits for infringement be continually brought forward, the Company will have a sorry time of it, and all its plans prove abortive. This, we apprehend, will prove the chief stumbling block.

A co-operative society for the benefit of inventors has been tried in this country some years ago, on a similar basis to that described above. It is not now in existence. There seems to be a difficulty in carrying out practically what seems plausible enough on paper.

THE "ALGONQUIN" AND "WINOOSKI" TRIAL.

On another page we publish the report of the Board of Engineers on the second unfinished trial between the engines of the *Algonquin* and *Winooski*. It will be seen that by a very slight change in the conditions of the two trials, the results are reversed; thus confirming the position of the SCIENTIFIC AMERICAN in relation to the matter.

Most of our cotemporaries have long discussions of these trials; for our own part we prefer to devote our time to the discussion of experiments that are so planned and conducted as to settle some principle or fact, or, at least, to throw some light on the problem under investigation. These trials of the *Algonquin* and *Winooski*, with two engines of very different design and construction—one running at 19 lbs. pressure, and the other at 71—may be well enough to settle the point in personal dispute between Mr. Forbes and the Navy Department, but ten thousand such trials would not show what is the most economical measure of expansion, even in a single engine of given size and form.

POLITICAL ECONOMY IN A NUTSHELL.

The leading questions in our politics at the present time, and for some time to come, must be those relating to finance. The first requisite for a clear and full understanding of these questions is a knowledge of the fundamental principles of political economy. If any one wishes to examine these principles we know of no other way in which he can do it with so small an expenditure of time, money, and mental effort, as by buying and reading the little work entitled "Political Economy in a Nutshell." It can be read in thirty minutes, it costs fifty cents, and its propositions are so plainly stated that every one who reads them must, of necessity, understand them. The work is published by G. Bartlett, No. 246 Canal street, New York, and is forwarded by mail, post-paid, on receipt of the price.

PETROLEUM FOR FUEL.

It will be remembered that we gave an estimate, some time since, of the value of petroleum for fuel, based on its chemical composition, the result being that one pound of petroleum would be equal to one and a half pounds of coal. The English papers say that a man in London has been making an elaborate series of experiments with petroleum in steam and other furnaces, and has come to the conclusion that one pound of petroleum is worth for fuel about as much as one and a half pounds of coal.

BRONZING TIN CASTINGS.—When clean, wash them with a mixture of 1 part each sulphate of iron and sulphate of copper, in 20 parts water; dry, and again wash with distilled vinegar, 11 parts, verdigris, 4 parts. When dry, polish with colcothar.—*Druggists' Circular*.