ABSORPTION OF HEAT BY VAPORS AND ODORS.

From Prof. Tyndall's lecture on Radiation, published by D. Appleton & Co., we take the account of his investigations of the absorption of heat by vapors and odors:—

"We commenced the demonstrations brought forward in this lecture by experiments on permanent gases, and we have now to turn our attention to the vapors of volatile liquids. Here, as in the case of the gases, vast differences have been proved to exist between various kinds of molecules, as regards their power of intercepting the calorific waves. While some vapors allow the waves a comparatively free passage, in other cases the minutest bubble of vapor, introduced into the tube already employed for gases, causes a deflection of the magnetic needle. Assuming the absorption effected by air at a pressure of one atmosphere to be unity, the following are the absorptions effected by a series of vapors at a pressure of $\frac{1}{60}$th of an atmosphere:—

Name of Vapor.	Absorption.	*Name of Vapor.*	Absorption
Bisulphide of Carbon	47	Sulphuric Ether	440
Iodide of Methyl	115	Formic Ether	548
Benzol	136	Acetic Ether	612
Amylene	321		

"Bisulphide of carbon is the most transparent vapor in the list, and acetic ether the most opaque; $\frac{1}{60}$th of an atmosphere of the former, however, produces 47 times the effect of a whole atmosphere of air, while $\frac{1}{60}$th of an atmosphere of the latter produces 612 times the effect of a whole atmosphere of air. Reducing dry air to the pressure of the acetic ether here employed, and comparing them then together, the quantity of wave-motion intercepted by the latter would be many thousand times that intercepted by the air.

"Any one of these vapors discharged in the free atmosphere, in front of a body emitting obscure rays, intercepts more or less of the radiation. A similar effect is produced by perfumes diffused in the air, though their attenuation is known to be almost infinite. Carrying, for example, a current of dry air over bibulous paper moistened by patchouli, the scent taken up by the current absorbs 30 times the quantity of heat intercepted by the air which carries it; and yet patchouli acts more feebly on radiant heat than any other perfume yet examined. Here follow the results obtained with various essential oils, the odor, in each case, being carried by a current of dry air into the tube already employed for gases and vapors:—

Name of Perfume.	Absorption.	*Name of Perfume.*	Absorption.
Patchouli	30	Portugal	67
Sandal Wood	32	Thyme	68
Geranium	33	Rosemary	74
Oil of Cloves	34	Oil of Laurel	80
Otto of Roses	37	Camomile Flowers	87
Bergamot	44	Cassia	109
Neroli	47	Spikenard	355
Lavender	60	Aniseed	372
Lemen	65		

"Thus the absorption by a tube full of dry air being 1, that of the odor of patchouli diffused in it is 30, that of lavender 60, that of rosemary 74, while that of aniseed amounts to 372. It would be idle to speculate on the quantities of matter concerned in these actions."

THE GREAT LAKES TO BE CONNECTED WITH THE MISSISSIPPI.

At the last meeting of the Polytechnic Association, Mr. Carter, of Chicago, gave some particulars in relation to the work of lowering the bed of the Illinois and Michigan canal, for the purpose of draining the Chicago river into the Illinois. This canal is 100 miles in length, with a width of 70 feet at the surface, and 30 at the bottom. It connects the Chicago river, at a point near the city, with the Illinois river at Peru. It passes over a summit of about seven feet elevation, the water being raised for this level by a steam engine. The first design of the engineers was to sink the canal deep enough to avoid this summit level; but, to save expense in construction, the Commissioners finally decided on the present plan. The citizens of Chicago have, for some time, been desirous to have the canal sunk through this level, in order to drain the waters of the Chicago river through the canal into the Illinois, instead of allowing them to flow, as at present, into the lake, where they foul the water of the harbor by the sewerage of the city. It has finally been decided to do this work at the expense of the city, and on the close of navigation this year, numerous gangs of workmen are to commence the task so as to complete it with the least possible delay. Mr. Carter said that the length of the summit level is about 18 miles.

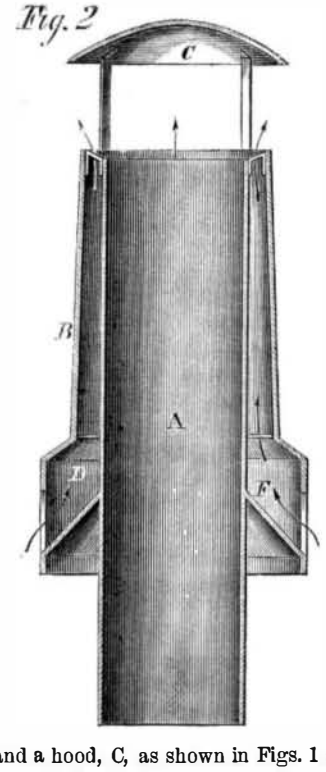
HENRIKSEN'S CHIMNEY TOP.

The inventor of this chimney cap asserts that it is a complete cure for smoky chimneys, and highly desirable where a great draught is needed. It is claimed that on sea-going or other steamers, the funnel may be made much shorter on this plan, and that for sailing vessels it is also desirable, making the fire in the galley burn freely in baffling winds when other arrangements fail. It has been used in some of the hotels and factories in San Francisco, and found to be advantageous.

Fig. 1

In construction it is simply a pipe, A, with a jacket, B, and a hood, C, as shown in Figs. 1 and 2. The lower part of the jacket is enlarged, as at D, and has openings, E, through which the air enters. It issues at the top, as shown. The jacket is supported by braces, F, at top and bottom. The air circulating through this appurtenance creates a current within the main pipe, A, which causes the fire to burn briskly. It would seem to be a useful invention.

Fig. 2



It was patented on Oct. 15, 1865, through the Scientific American Patent Agency, by B.A. Henriksen, of San Francisco, Cal., whom address for further information. [See advertisement on another page.]

FOR INVENTORS AND MECHANICS.

We desire again to call the attention of our readers to the new work, as above, lately published by Messrs. Munn & Co., Scientific American Office, New York City. Every person who is interested in the mechanic arts or inventions should have a copy. It contains a great deal of valuable information, crystallized, so to speak, into the smallest compass; and this reduction of space, by saving paper, permits the issue of the book at the insignificant price of 25 cents. Among other things, it contains 112 diagrams illustrative of the best mechanical movements—reduced by the photograph and engraved expressly for the work. Mechanics and inventors will find these engravings to be of value as references, whenever they are searching for good methods of obtaining any required motion of parts. It likewise contains all the Patent Laws of the United States, conveniently arranged with appropriate headings, for reference; also the official rules and directions for doing business at the Patent Office; forms for assignments of patents; useful advice upon the sale and introduction of patents; diagram of the condensing steam engine, with letters of reference to all of the parts; a chapter upon practical geometry, with diagrams; several illustrations of gasket braiding, with directions of value to engineers; table of the pressure and temperature of steam; table of the effects of heat upon the various metals and other bodies; how to make tracing paper; table of the electrical conducting power of metals; how to calculate the horse-power of a stream of water, a water wheel, or a steam engine—together with instructions how to obtain patents in the United States and other countries, with schedule of fees, etc., and much other interesting matter, which we have not space here to mention. Sent by mail every where. Address Munn & Co., No. 37 Park Row, New York.

LATEST FOREIGN INTELLIGENCE.

What Proper Inspection Does for Steam Boilers.—A few months ago we laid before our readers a summary of the report of the engineer of the Midland Steam Boiler Insurance and Inspection Company, and we now extract the following from the report of the chief engineer to the Manchester Association for the Prevention of Boiler Explosions. In one month, he says, 373 boilers have been examined, and 98 dangerous defects met with. Three explosions had taken place in as many weeks in his district, through which one life had been lost, and four persons injured. Not one of these boilers, however, was under the inspection of the company, and competent inspection would certainly have prevented the explosions.—*The Ironmonger.*

In experimenting upon the wood fuel, Count Rumford found that lime-tree wood gave out most heat in burning.

Highway Steam Locomotives.—"An Engineer" writes the appended letter to an English cotemporary:—Feeling that your paper would be the proper channel through which all mechanical inventions of use and utility should become known, I have thought that the following description of a trial trip, made by Richards and James's patent highway locomotive engine, manufactured at the Victoria Ironworks, West Croydon, would be interesting to your many readers. This engine is nominal 32-horse power, having two 12-inch cylinders, 12-inch stroke, fixed upon the bed-plate or frame, upon which also rests the boiler. The boiler-working pressure is 100 lbs. per square inch, proved 250 lbs., the steering apparatus is attached to the front wheels, and the driver is the engineer and steersman, being able, by the arrangement adopted, to handle his engine from his position as the steering-wheel, one stroker and driver being only necessary to man the engine. The driving gear is divided into three speeds, changed at will of the steersman, viz., two, five, and eight miles per hour. The machinery is entirely hidden from view by a very neat framing. The distance from the ground to ash-pan is 2 feet 2 inches. She carries a tender, with donkey pump attached, for pumping water from the sides of the roads, steam being taken through a flexible tube from a large engine boiler; this pumps throws 10,000 gallons of water per hour, filling the tender, capacitated to carry 1,000 gallons

—enough water for twenty miles. The boiler is fitted with waste steam pipe, which is conducted into the ash-pan for damping the fire when the engine is at rest, or standing on the roads. The engine wheels are constructed upon quite a new principle, having chains to the driving wheels to prevent slipping in ascending steep inclines, or in traveling over rough roads, and side teeth in the front wheels, which may be protruded at pleasure, to act as a flange of a railway wheel, to prevent the engine striking from one side of the line to be pursued, or when it turns sharp curves, or stands upon sideling roads, these teeth are of considerable value. This engine passed through town and district, and main thoroughfares, on Monday last—being the first day of the fair—which were crowded to excess by vehicles, horses, and spectators, without emitting any steam or smoke, and without making any noise, or meeting with any mishap, with a train of eight vans attached, the length of train from front of engine to end of last van being 160 feet.

WORK FOR WOMEN.—The Directors of the London and Northwestern Railway have just completed the erection of a factory for the employment of unemployed females, with sewing machines, at Crewe, and it is in contemplation to give out machines to private families, after the girls have been properly trained.

A "Spectroscope" is now on exhibition in England which produces some strange illusions. The contrivance is based on the inventions of Professor Pepper and Mr. Tobin. The novel portion is that called, "Proteus," in which a box is wheeled on to the center of the stage, and some one is locked up in it. When the box is reopened, after the lapse of a few seconds, some one else is found therein. Although, when at first exhibited, the box appears to be empty, yet a young woman and a boy are seated therein, and in proper order are let out and walk upon the stage.

A STATUE WEEPING BY STEAM.—The Florence correspondent of the *Independence Belge* says that a singular discovery has been made in a church in one of the faubourgs of Milan. A statue of Saint Magdalen, which has long been famous for weeping in the presence of unbelievers, was recently moved, in order to facilitate repairs for the church. It was found that the statue contained an arrangement for boiling water. The steam passed up into the head, and was there condensed. The water thus produced its way by a couple of pipes to the eyes, and trickled down upon the cheeks of the image. So the wonderful miracle was performed.

A NOVEL RAILWAY BRAKE.—Some few months since, says the *Mining Journal*, we referred to an improved anti-friction railway brake, invented by Mr. Shaw, and it is gratifying to find that an opportunity will speedily be afforded for the making of comparative trials with the brakes now in use—the London, Brighton, and South Coast Railway Company having kindly lent a carriage to enable Messrs. Gardiner and Mackintosh, of New Cross, to apply the invention for the purpose of testing the principle upon which the brake is constructed. Mr. Shaw claims that a train traveling at the rate of 50 miles per hour can, with his brakes, be brought to a stand in 150 yards, or about one-third the distance required with the ordinary brakes; and that, although he applies a brake to every wheel on the train, the entire brake power is in the hands of the engine driver. It will be remembered that, in the place of the ordinary brake blocks, Mr. Shaw proposes to employ anti-friction wheels, acting upon the peripheries of the wheels of the carriage to which the brake is to be applied, and upon the axle of the anti-friction wheels he places a "fly," or fan, similar to that used in a clock or musical box. When the train is traveling in the ordinary manner, the anti-friction wheels fall free from the peripheries of the running wheels, and the progress of the train is not interfered with; but in the event of the engine driver perceiving danger, he forthwith proceeds to stop his engine, and the buffers being thus pressed together, levers are caused to press the anti-friction wheels against the running wheels, and the "fly" is at once set in motion. Mr. Shaw is confident of success, because, inasmuch as the power required to drive a fan of the size he uses is estimated to be equal to about three horses he anticipates that each fan applied will give a 3-horse power retarding force. As soon as the carriage to which the brake is being applied is ready for running we shall publish the results obtained. Mr. Shaw has now encased the fan in a cylinder, so that the inconvenience he feared might arise from the dust created by the revolution of the "flies" cannot possibly be experienced.

ENGLISH PATENT FOR REFINING IRON.—Mr. R. F. Crawshay, and J. A. Lewis, of the Cayfarthfa Iron Works, have patented a plan for refining iron by introducing into the boiling furnace sulphate of iron and oxide of lead. The chemical changes produced by these ingredients are said to be 1. The conversion of the carbon of the mass into sulphuret of carbon by the decomposition of the sulphate, and its removal by sublimation, 2. The separation of the silicious and argillaceous substances, by the lead of the oxide forming by their union a matrix from which the iron rapidly precipitates, 3. A rapid elevation of the temperature of the mass operated on by the evolution of oxygen from the acid of the sulphate of iron and the oxide of lead, producing suddenly a greater liquefaction, which facilitates the separation of all foreign matter.

The "Winooski" and "Algonquin"—Official Report of the Results of the Trial.

NEW-YORK, Nov. 9, 1865.

SIR:—We have the honor to present this our report on the late competitive trial of the machinery of the *Winooski* and *Algonquin*, to determine the economy of fuel with which the power was respectively developed in the two cases.

The trial was conducted in exact conformity with the instructions of the board of civilian experts, consisting of Messrs. Everett, Copeland, Baird, Hibbard, Coryell, Bromley, and Wright.

The paddle-wheels were exactly alike, and the paddles had the same dimensions and immersion.

The vessels were placed on opposite sides of the same pier, with a view to equalize the influence of the tide; but it was discovered in the course of the preceding trials that, owing to an opening through the pier at its head, the tide acted more unfavorably for the machinery of the *Winooski* than for that of the *Algonquin*. The opening was not suspected when the pier was originally chosen.

The coal was weighed on the pier for both vessels, taken from the same pile, and weighed on the same scales. An agent of the contractor for the *Algonquin's* machinery was present and noted the weighing. An indicator diagram was taken every half hour, from each end of the cylinder of each vessel; and the mean result from them will be found in the accompanying table, which also contains all the other data necessary to be known.

The *Winooski's* machinery made the ninety-six hours' run, working in the most perfect manner, and steadily inproving, giving a better result for the last twelve hours than for the first. The performance of the machinery, in every particular, leaves nothing to be desired for efficiency in a marine paddle-wheel steamer. Its durability and reliability could be depended upon for any length of cruising.

The machinery of the *Algonquin* was evidently wanting in these particulars; and in proper adaptation for marine purposes; in style, finish, and convenience for manipulation, it was also far behind its competitor. Instead of performing this in the stipulated 96 hours of the trial, it was stopped by Mr. Dickerson, its designer, and the agent of the contractor, after 69 hours and 8 minutes, and it will require about six weeks from date of stopping to repair and readjust it sufficiently to commence the full power trial which is still to be made.

At the time the *Algonquin's* engine was stopped it was falling rapidly behind the *Winooski's*, the difference in the performance being nearly one revolution of the wheels per minute.

The stoppage, in our opinion, was caused by this fact, and was wholly unauthorized, unwarranted, and unjustifiable, and was done in open defiance of our prohibition.

With regard to the economical results, they are as follows, according to the two methods of determining them:—

By the first method, taking the cubes of the number of revolutions made per minute by the paddle-wheels for the measure of the power, we find the power with the *Algonquin's* machinery to cost about two and one-tenth per cent more in fuel than the power with the *Winooski's* machinery

By the second method, taking the indicator results for the measure of the power, we find the power with the *Algonquin's* machinery to cost about ten and six-tenths per cent more in fuel than the power with the *Winooski's* machinery.

By both methods, the economy of fuel is in favor of the *Winooski's* machinery, and the difference in the results given by the two methods is probably due to the difference in the effects of the tide on the paddle wheels of the two vessels.

As the anthracite used in this trial did not give the same per centum of refuse for both vessels, on account of the difference of time of the experiment, we have taken the coal consumed per hour, less the refuse, as the true weight of fuel consumed,

With regard to the rapidity with which steam could be raised in the boilers of the two vessels, from water of the same temperature, and with equal weights of wood and coal, the difference upon this trial was six minutes in favor of the *Algonquin's* boilers.

The point at which the steam was cut off in the cylinder of the *Winooski* was ascertained by hooking on the eccentric rod, and turning the engine by hand, noting exactly on the main guides the point at which the toe of the rockshaft left the lifter on the lifting-rod.

This measurement gave 4 feet 10 inches for the upper stroke, and 6 feet for the lower stroke; which, as the stroke of the piston is 8 feet 9 inches, gave a mean of 0·619. The cut-off of the *Algonquin's* engine, not being a positive one, could not be so measured, but has been computed from the indicator diagram.

We are, very respectfully, your obedient servants,

Chief-Engineer ROBERT DANBY,
Chief-Engineer EDWIN FITHIAN,
Chief-Engineer MORTIMER KELLOGG.

Hon. GIDEON WELLES, Secretary of the Navy, Washington, D. C.

Data of the Competitive Trial of the Winooski and Algonquin, for Economy of Fuel, at the Wharf, New York, 1865.

	Winooski.	Algonquin.
Date of commencement, Oct. 23, P. M.	4·28	4·22
Duration of the experiment in hours and minutes	96	69·8
Total number of revolutions	85,884	62,407
Total number of pounds of coal consumed	152,015	111,344
Total number pounds refuse from the coal	30,400	19,500
Total number pounds of coal consumed, less refuse	121,615	91,844
Percentum of refuse	20	17·51
Average steam pressure in steam-pipe, in pounds per square inch	19·64	71·63
Average point of cutting off steam	0·619	0·132
Average vacuum in condenser, in inches of mercury	27·80	20·54
Average barometer	29·94	29·94
Average revolutions per minute	14·9104	15·0450
Average indicated pressure on piston	26·276	31·6
Average indicated horse-power	545·485	517·317
Pounds of coal consumed per hour	1583·49	1610·57
Pounds of coal consumed per hour, less the refuse	1266 82	1328·56
Pounds of coal consumed per hour, per indicated horse-power	2·905	3·113
Pounds of coal, less the refuse, consumed per hour, per indicated horse-power	2·322	2·568
Temperature on deck	53·6	53·6
Temperature in fire-room	98	108·9
Temperature in engine-room	66·8	70·1
Temperature of injection water	55	55
Temperature of discharge water	85·9	69·2
Temperature of feed water	104·3	161·4

Scheme to Tunnel the Chicago River.

At the last meeting of the Polytechnic Association, Mr. Stetson stated that a plan is proposed in Chicago, which it is understood is to be carried into effect, for tunneling the Chicago river. The river is only about twelve feet deep, and the plan is to exclude the water by coffer dams, and construct the tunnel in the open air, having the top of the tunnel come just level with the bottom of the river. The footpath is to be in the middle, with a carriage way on each side.

A CONCENTRATED solution of chloride of zinc, which has been boiled with an excess of the oxide of that metal until it does not discolor litmus, will dissolve silk. By means of the dialyser the silk can be separated from its solvent in the form of a colorless inodorous solution.