

**VARIOUS METHODS OF COOLING AIR.**

Ice, as a refrigerant, might either be placed within or without the ducts that bring in fresh air. In the first case, generally preferred by the inventors, it melts, and afterwards evaporates in the fresh air. The cold resulting from the fusion and warming of the water produced not being more than a sixth of that due to evaporation, it therefore follows that the amount of moisture introduced into the air is about one seventh—nearly as much as that of evaporation alone.

In the apparatus shown in Fig. 1, the air conduit, C C, passes through a casing, A B, formed of a double lining. The interior space, D, surrounding the air conduit, contains ice. The next space, B, is filled with a non-conductor of cold. A tap, R, lets off the water formed by the melting of the ice into a receiver, M. The air conduit, C C, is fitted with mechanical fly wings, *a b*, which increase the contact of the air with the sides refrigerated by the ice. These metal fly wings are fixed to a vertical axis, and in successive rows,

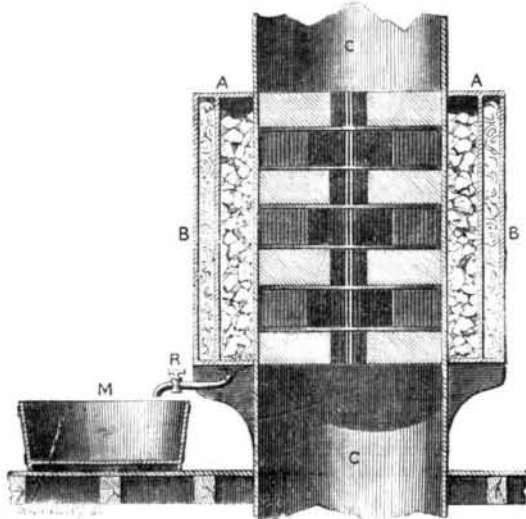


FIG. 1.—ICE REFRIGERATOR.

but in different planes, which multiplies the surface over which the air has to pass. This contrivance, which manifests ingenious details of construction, may have been applied with success, but it is far from being sufficiently inexpensive.

By causing currents of air to pass through vaults built at a depth of six or eight feet below the surface, they will be perceptibly cooled in summer if they are of any considerable length.

In ascending to the attics of dwelling houses, the immoderate heat developed by the sun's rays is very perceptible, especially in cases where the roofs are covered with metallic substances. Now, the question is, how to turn the heat to account for the introduction of pure air. The mode of doing so is very simple. A ventilating chimney is placed on the top of the building, to which abut side props, forming a double ceiling, and having communication by vents in the cornices. The fresh air coming from the cellars enters the room by hollow pil-

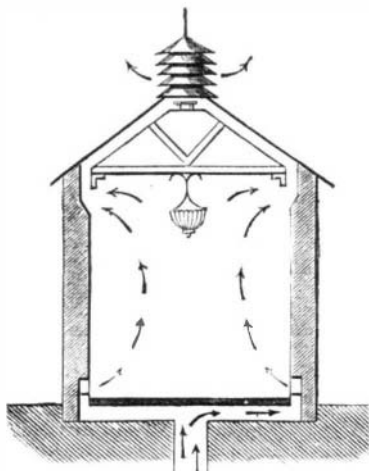


FIG. 2.—VENTILATING CHIMNEY.

lars or vertical props, according to circumstances; and at night, the natural heat of the sun not being available, artificial heat is employed.

Another method is the imitation of the effect of rain; it is susceptible of being used almost directly to most edifices and dwellings. Water applied in the morning and during the heat of the day not only obviates the heating of roofs, but, as long as the temperature of the water is less than that of the air, it can maintain the interior walls at a temperature far inferior to the latter, and it cools the air ascending to the attics.

**COOLING THE AIR BY MEANS OF AMMONIA VAPOR.**

The apparatus represented in Fig. 3 is intended to produce a cooling of the air. It is composed of a chimney, A A, the height of which is variable, at the top of which is vertically placed the tubular generator, B, containing a solution of liquefied ammonia to the line, *b d*. This perfectly isolated receiver is in direct communication with the serpentine con-

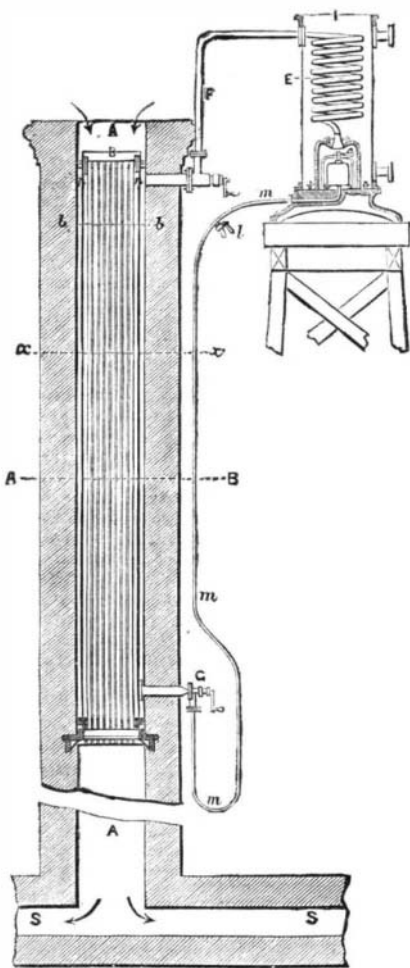


FIG. 3.—AMMONIA REFRIGERATOR.

denser, E, by the two pipes, F, G; the receiver, E, is also perfectly isolated. Around the serpentine circulates well water. No matter what the temperature may be outside the apparatus, it is evident that the interior pressure would be superior to that of the atmosphere; the ammonia would therefore vaporize as well in the chamber, *b b n n*, as in the tube, *m m m*. The gaseous current being thus formed, sweeping through the interior atmosphere of the tubes and serpentine, would carry before it the air, which would be expelled by turning the tap, *l*. By means of an india rubber pipe placed upon the nozzle of this tap, this current would be

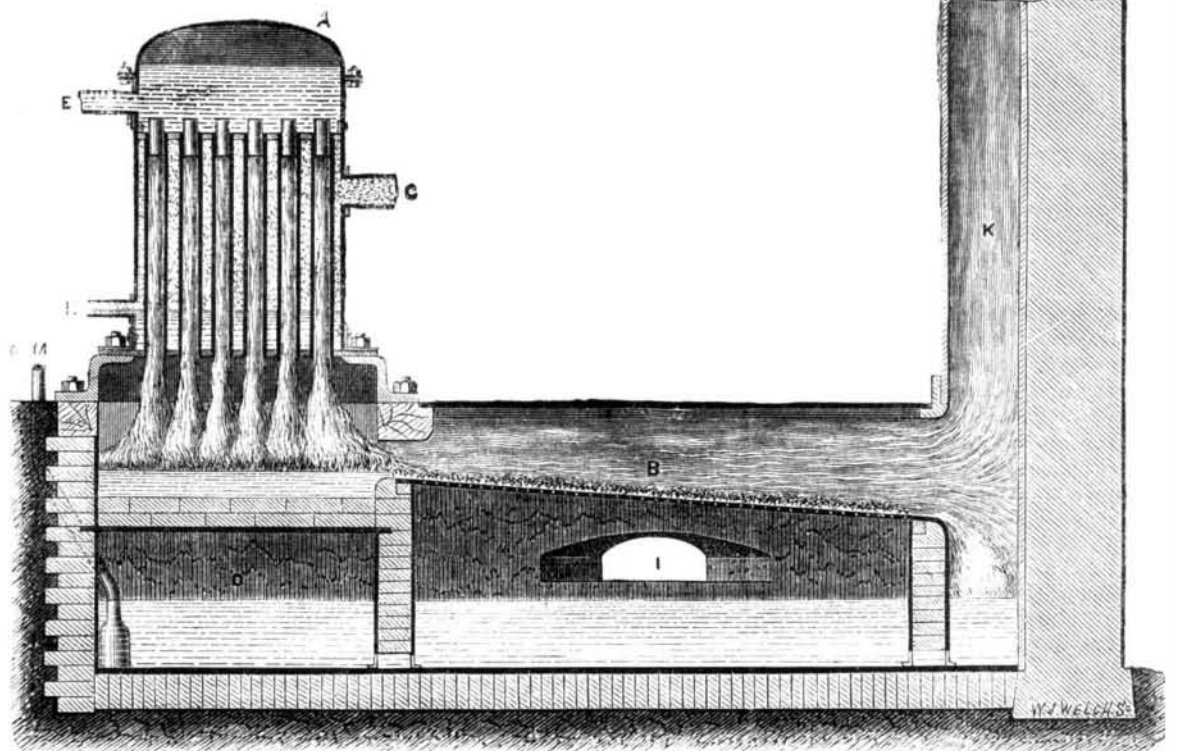


FIG. 4.—AIR REFRIGERATOR.

received in a vase containing water. The air would escape, the ammonia would remain in the water, and, when the absorption was complete and no more bubbles were formed on the surface, it would be seen that all the air had escaped; it would then be necessary to close the tap, *l*. This being done, nothing would remain in the interior but the liquefied ammonia, the vapor of which, immediately attaining the maximum of tension, would at once fill the space left empty by the expelled air. If, then, by any accident, the temperature of the generator, B, became higher than that of the condenser, E, vapor would at once be formed in the receiver, B, which would proceed to condensation in the receiver, E, until the balance of temperature was restored. This action would be all the more rapid

ter, and of a ventilator, the current of which passes through the orifice, I. The steam escaping from the cylinder penetrates to C, disperses through the space between the tubes, condenses itself by contact, and produces a vacuum. The water, which has just condensed the steam, passes above the perforated plate, B, upon which a current of air is continually in action from above and beneath, which divides the water and instantly cools it; it falls into the tank, D, whence it is pumped by means of the tube, M, and brought back by E; thence it passes uniformly through all the tubes over the whole extent of the refrigerating surface by means of little fluted plugs, or similar contrivances, at the base of the apparatus at H, by means of a pump, to be restored to the feeding tank. Applied to ordinary condensers, the refrigerator effects a considerable economy of water, and produces other

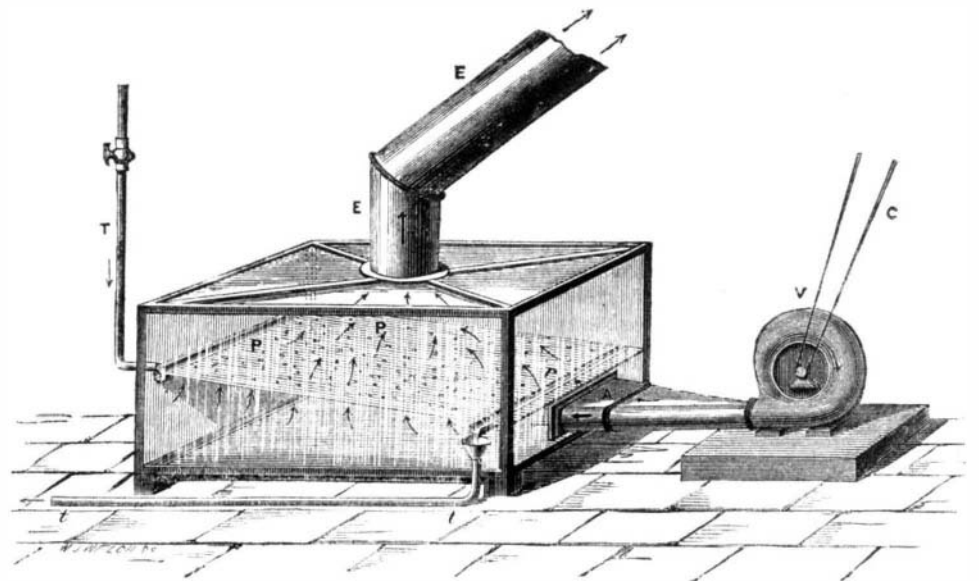


FIG. 5.—VENTILATING APPARATUS.

in proportion to the rapidity with which the vapor is induced in the vacuum; and would be also in proportion to the condensation. Thence there would be a relation between the force of the condensing action in E, the promptitude of vaporization in B, and the energy of refrigeration of the body passing in the tubes, *x x*, and round the casing, B. Now, this body is no other than the atmospheric air freely entering at the orifice, A, and penetrating the tubes, *x x*, drawn by the increase of density communicated to it by refrigeration, and causing it to descend the chimney. If the surfaces are sufficient the temperature will remain equal between B and E; therefore if the water which reaches the condenser is at 50° Fah., the air which emerges at the lower part will have that temperature; descending the chimney, A A, this air passes by the conduits, S S, to freely distribute itself in the localities where it is necessary to produce a cooler atmosphere. This arrangement is ingeniously conceived but complicated.

advantages, which it is unnecessary to mention here, not concerning the subject under consideration.

If the steam boiler and steam be suppressed in this apparatus, and the perforated metallic plate and ventilator be only retained, the apparatus shown in Fig. 5 is made.

Through the perforated plate, either of metal or some other material, P, from beneath to above, the ventilator, V, set in motion by the hand, or, in the case of a more considerable application, by some mechanical motor, keeps up a current of air which passes through the numerous holes of the plate. Above this plate cold water is introduced by the pipe, T, furnished with a regulating tap; the water passes into a water pipe, whence it issues in a uniform manner over the plate, which is slanted in such a manner that the thickness of water shall not exceed certain limits; in some cases ice or chemical solutions, as those of phenic acid, may be substituted, according to the application of the apparatus. The pressure exercised by the propelled air suffices to maintain the water on the surface of the plate, and prevents it passing to the lower part. The water flows slowly on to the plate, and, after having passed over and given its coolness to the air which pene-

trates it, finally reaches the other pipe, by which it runs to the issue at t; in most cases this water is again useful for other purposes. As to the cooled air, it penetrates into the upper part of the apparatus, escaping by the tube, E, and reaches the places where it is wanted.

MEDICAL NOTES.

An Antidote for Mercury and Lead Wanted.

It is well known that the doctors of the regular or allopathic school insist on the free use of mercury, especially in secondary syphilis, that dreadful scourge of civilized countries. Many of our Western and Southern doctors pour in the calomel and blue pill for almost everything, as freely as the profession used to do in former times. Since this is so, and since the other medical schools have not yet furnished a practical substitute for mercury, the great want in medicine is a counteractor for a remedy often as bad if not worse than the disease. Chemistry and experiment must help the doctors, and still more the sufferers from mercurialization, if it be possible. Chemists and physiologists long ago found two, and only two, efficient agents, capable of rendering mercury in the system harmless; and these two substances, namely, iodine and sulphur, happened also to be the best neutralizers of another common cumulative poison, lead. But the difficulty was and is to cause the assimilation of iodine and sulphur, or either. Sulphur is nearly insoluble in any menstruum capable of being taken into the stomach. Iodine is very soluble in alcohol, oil, etc., and even in water to some extent, but largely soluble as iodide of potassium, a drug now used to excess. Unfortunately this iodide, also the tincture, are but slightly assimilated, passing off by the bladder. The small amount of iodine contained in that well known organic substance, cod liver oil, would be likely to prove more effective as an antidote to lead and mercury than a large quantity of iodide of potassium, because the organic oil enters into the blood and tissues. We put forth the suggestion that some vegetable may be found which is rich in iodine, also other plants, and harmless ones, may contain sulphur in an assimilable shape, for sulphur is an exceedingly common element of organisms in general. If we could have strong extracts of such plants, the object spoken of would be accomplished. In that case, our calomel givers could salivate their patients to their hearts' content, and have them live through a dozen courses of mercury, a matter of profit and pleasure to every regular doctor.

Thousands of cases of chronic rheumatism, as well as consumption and other fatal diseases, have been traced to the use of mercury. Lead poisoning has become alarmingly prevalent of late years, producing colic, constipation, hardened liver, neuralgia, nervous dyspepsia, and paralysis, which sometimes attacks people even in the prime of life. We will not discuss the question of lead in water pipes farther than to observe that every decent chemist knows that pure water acts on lead with astonishing quickness. To have water pipes, as used at present, coated internally with a sulphide or sulphate seems to be the only good practical preventive of lead poisoning. But in the case of lead pipes kept for weeks in hogsheads and barrels of ale and cider, there the solubility is certain and its effects destructive or pernicious to no small degree. Such dangerous nuisances should be abated by law. Again, soda fountains where the water, highly charged with carbonic acid, acts on lead, and sometimes on copper in old fountains, are things deserving of legal attention. Many of the hair dyes in market, and some of the cosmetics, are well proven poisons.

Ice as a Medicine.

The great value of ice in certain diseases is not fully recognized by the medical profession, or by the public. Many years ago, it was found by one of the best English physicians—we think Dr. Marshall Hall—that small pieces of ice thrust into the rectum proved a safe and speedy remedy in cases of dysentery, where opiates and sugar of lead had been tried without effect. Very recently, that distressing complaint to which old people, travelers, and others are liable, retention of urine, has been relieved by the same use of ice as mentioned above. This plan is due to M. Cazenave. Common experience has shown that the swallowing of ice instead of ice water by people, in hot weather, is perfectly safe.

Effects of Uric Acid.

Dr. Gigot-Suard has given uric acid to dogs in doses of from 3 to 61 grains in 24 hours, and continued it for one or two months. The acid occasioned remarkable morbid lesions, throwing light on a large number of chronic diseases. The alkalinity of the serum of the blood was often diminished, and it contained crystals of the acid and urate of soda. The organs and tissues upon which uric acid exerted its action are, in order of frequency: the skin, mucous membranes and their glands, the lungs, kidneys, liver, pancreas, brain, lymphatic glands, articulations, spleen, envelopes of the spinal cord and heart. Various forms of disease appeared in all these parts. Cancerous and tuberculous degeneration was produced several times in the lymphatic glands. These experiments are very interesting, and may lead to a more accurate view of the cause and cure of consumption and several other grave diseases.

The New Electric Light.

On the evening of the 5th of May, some interesting experiments with MM. Ladygin and Kosloff's electric light were conducted at the engineering works of Messrs. Warner, Euston Road, London. To obviate the difficulty of carbon being consumed when burnt in contact with oxygen, M. Ladygin placed sticks of carbon in a closed glass chamber filled with a gas not containing oxygen; but owing to the use of metallic connections, the carbon was subject to fracture. M.

Kosloff succeeded in overcoming the difficulties by using a special metal of which he forms the holders for the carbon rods, and these are placed in the closed glass chamber.

The lamps which were experimented with were nine in number, six of them having two carbon rods, either of which could be placed in connection with the current of electricity. The carbon rods were all 1/2 of an inch in length, and one in each lamp was 1/2 of an inch in thickness, the others being a trifle less in thickness. The other three lamps contained each a carbon rod, three inches in length, 1/2 of an inch thick, and also connected with the main current. The first experiment consists in burning a carbon rod in contact with the atmosphere, the rod being consumed in a few minutes. The current was then turned on the thicker rod in each of the six lamps, and a brilliant and steady light was produced, which improved as the current was increased in intensity. The reason for lighting the thicker rod first was that it might consume the oxygen in the lamp, by which the rod was slightly reduced. The current was then directed through the second rod with equally satisfactory results in all the six lamps. The three lamps with the longer carbon rods were then lighted and successfully exhibited, changes being frequently from the six to the three lamps and back again. The apparatus used for producing the current was Gramme's magneto electric machine. With the machine running at about 200 revolutions a minute, a moderate light was obtained, which was greatly improved at 300 revolutions, the maximum of intensity being obtained at 450 revolutions. The strength of the light depends upon three things—on the power of the machine and the number of its revolutions, on the length and thickness of the carbon rods, and on the quality of the carbon. The experiments showed that, with the same strength, of current and the same number of revolutions, double the amount of light was obtained with three long carbon rods as compared with the six short ones. The experiments demonstrated satisfactorily the fact that the electric current could be subdivided, and hence, if practice confirms experiment, which it is believed it will, there is a wide field open for the application of Kosloff's system.—Telegraphic Journal.

An Unfortunate Discoverer.

W. T. writes to say: "In No. 24 of Volume XXX of the SCIENTIFIC AMERICAN, Mr. John Hepburn, of Gloucester, N. J., states, in his communication on zodiacal light, that he was the discoverer of the glacial epoch theory, which Professor Agassiz only proved to be true. I do not deny that Mr. Hepburn discovered that theory; but it is a fact that Agassiz adopted it from Karl Schimper, the late brother of the African traveler Schimper, who was released by the English-Abyssinian war. Karl died in February, 1868, in Schwetzingen, near Heidelberg, Germany, of dropsy and of the ill treatment by a malicious neighbor. Schimper mentioned this fact to me, and complained that all his discoveries had been stolen from him, and he had no power to defend himself against the lions of Science. In fact, they left him nothing but his law of the position of leaves. When he was dead, a valuable collection of stones, curiously shaped by the action of water, was destroyed. He was trying to find a law for such shapes; but he never told me more about it, for fear I would misuse the information, although I was an intimate friend of his."

THE State of New York has appropriated \$50,000 for the erection of a monument at Saratoga to commemorate the surrender of the British army under General Burgoyne to the American forces under General Gates, October 17, 1777. The monument is to be 230 feet high.

THE new aquarium, now in process of construction at Manchester, England, will be a splendid affair. The tank frontage will have a length of 750 feet.

To our Friends and the Public.

After the full statement heretofore published of the difficulty of our firm with the Customs authorities, and the subsequent exhaustive examination of the whole matter by the Committee of Ways and Means, which resulted in the entire remodeling of the "Moiety" and "Seizure Acts," we had not supposed it would be necessary to add anything further in the way of explanation. But in the brutal and cowardly attack made upon us during the closing hours of Congress by General Butler, certain charges were preferred by him in his character as a Representative, upon the floor of the House, against our firm, so definite and with so much of apparent authority that we feel called upon, in justice to ourselves and the public, to make once more a brief statement.

The charges specifically preferred were, in the main, First, that we had, as a firm, attempted to defraud the Government and evade the revenue by importing metals, in the form of works of art and statuary. In reply to this it is only necessary to say, that the importations to which General Butler referred were made before the firm of Phelps, Dodge & Co. came into existence, and before anyone of the present or late members of the firm became connected with the metal importing business; the senior member of the firm, William E. Dodge, being at the time engaged in the drygoods business.

Second, that in the tariff act of April, 1864, which temporarily increased the rates of duty on imports of tin, it was used for the packing of tin, and had a comma taken out of one place and put in another, and thereby cleared \$2,250,000.

The exact facts in respect to this charge are as follows: In the very full revision of the tariff, as embodied in the act of June, 1861 (and not the act of April, 1864, so specifically mentioned by General Butler) it was decided by both Houses of Congress, after full discussion, that an increase of duties on tin and tin plates would imperil the large industries already taxed under the internal revenue in which tin was used for the packing of fruits, fish, and vegetables, meats, and the like, and so tend to reduce, rather than increase, the receipts of the Treasury. At the same time it was decided to increase the duty on sheet iron, galvanized with an admixure of tin, which article had been imported under the name of "tin plates galvanized," and so definitely and distinctly named in connection with and at the same rate as "galvanized iron" in every successive tariff since 1857. The bill was passed on the 30th of June, and went into operation immediately. On examining its provisions, we found that while the duty on "tin and tin plates" remained unchanged at twenty-five per cent *ad valorem*, the addition of a comma after the word "plates," in the clause "tin plates galvanized," rendered the whole paragraph ambiguous if not absurd, and apparently imposed a new duty of 2 1/2 cents per pound, an increase of one hundred per cent on existing duties. Seeing how impossible it would be to enter our invoices at two conflicting rates for one and the same article, we applied at once to the Collector for a decision in respect to the course to be followed. The Collector saw the difficulty, and referred us to Mr. Fassenden, then in New York, and just appointed Secretary of the Treasury. We called upon him, and he immediately advised us and to the Collector that he had been chairman of the Senate Committee, and also of the Conference Committee which had charge of the tariff bill in question; that he fully remembered the discussion as to tin plate, in which he had taken part; that the will of both committees had been that tin plates should

remain at 25 per cent *ad valorem*; that the "comma" had evidently been added by mistake in the act of engraving, and could not be considered as the true interpretation of the law.

He accordingly ordered the Collector to pass the goods at 25 per cent, and stated that, on his return to Washington, he would issue a special order making the construction official; and this he did under date of July 22d, after taking full time for consideration and consultation with his former colleagues in Congress and the experts of the Treasury Department. As finally interpreted by Mr. Fassenden, moreover, the law was not in our direct favor; but, on the contrary, had the technical error been allowed to stand and to entail a very excessive increase of duties, the advance in the price of stock on hand would have yielded to us, in common with all other importers and dealers, a very considerable profit. The facts, therefore, were exactly the reverse of those stated by General Butler.

Third, General Butler states that, in our large and complicated business, every invoice brought by day by us to the Custom House, was wrongly stated, and that we were consciously and continually guilty of fraud. General Butler knows this to be untrue. He knows, on the contrary (for as the paid attorney of the informant, he has given attention to the subject), that, after a most careful and merciless examination of some thousands of our invoices by Jayne and his experts, aided by our own clerks, there were found only some fifty that could in any way be made the subject of controversy; and that in the case of some of these, of from twenty to thirty thousand dollars each, the utmost possible loss to the Government could not have been in excess of 80 cents to one dollar per invoice. And furthermore, that the total loss claimed by the Government on all the invoices was only about \$1,600, out of an importation of some \$43,000,000, and covering the space of five years.

We believe General Butler further knows, but willfully conceals the fact, that the same error and misunderstanding of the tariff law which compelled us, under severe penalties, to invoice our goods both at cost price and at market price, led us, in the case of a great number of important invoices, to invoice their value above cost, and so resulted in a gain to the revenue and a loss to ourselves immeasurably greater than the Government claims to have lost.

Finally, looking at all the circumstances and the character of this speech, its constant falsifications and perversion of truth, and its brutal personal use, we are quite willing to leave the verdict as to its effect, to any who have fairly looked into the matters of which it treats. PHELPS, DODGE & CO.

New York, June 26th, 1874.

NEW BOOKS AND PUBLICATIONS.

THE BROOKLYN COUNCIL OF 1874. With Documents and an Official Report of the Proceedings. New York: Woolworth & Graham.

SIXTH ANNUAL REPORT ON THE NOXIOUS, BENEFICIAL, AND OTHER INSECTS OF THE STATE OF MISSOURI. By Charles V. Riley, State Entomologist.

This is a document to be read attentively by the scientist, naturalist, and the farmer; and its value is not confined to the enterprising State which publishes it. Professor Riley has a profound and minutely accurate knowledge of the interesting and complicated science to which his life has been devoted; and his reports are part of the contemporary history of our country, and should be circulated everywhere.

THE LAW OF DESIGN PATENTS, with Digests and Treatise. By William Edgar Simonds, Counsellor at Law. Price \$4.50. New York: Baker, Voorhis & Co., 66 Nassau street.

The Supreme Court having recently passed somewhat fully upon a design patent case, the author has deemed the present a fit opportunity to collate cases on the subject of design patents, and to present them digested and supplemented with deductive comments in the volume above named. The status of these patents has heretofore not been attended with doubts; and hence the present work, aiming as it does to cover the entire field, and to give a clear comprehension of the decisions of the courts on the subject, will doubtless meet with a ready welcome at the hands of the profession.

OLD AND NEW. The July number of this admirable magazine, edited by Edward E. Hale, opens a new volume, the tenth. For vigorous thought, entertaining and useful contents, the magazine has no superior. \$1 a year. Boston: Roberts Brothers.

TROW'S NEW YORK CITY DIRECTORY FOR 1874-75 gives some interesting statistical information regarding the increase in population of the metropolis. Last year, the number of names contained was 225,161—this year it is 229,503. Estimating each name as the representative of five persons, an augmentation of 7,000 in population is indicated. The volume contains a newly engraved and excellent map of the city, including the two new wards recently added. The arrangement of names, etc., is the same as in former years, and there is a very large number of advertisements of prominent business houses. Published by the Trow City Directory Company, 11 University Place, New York. Price six dollars.

Inventions Patented in England by Americans.

- (Compiled from the Commissioners of Patents' Journal.) From June 2 to June 16, 1874, inclusive. CAR TRUCK AND AXLE BOX.—A. Higley, Cleveland, Ohio. CLOTHES WRINGER.—T. G. Corliss, New York City. FOLDING BEDSTEAD.—E. E. Everett, Philadelphia, Pa. HARNESS.—I. M. Singer (of New York City), Paterson, England. MAKING PAPER BOXES.—H. R. Heyl, Philadelphia, Pa. MAKING STENCH TRAPS, ETC.—W. A. Butler, New York City. MAKING WHITE LEAD, ETC.—A. P. Mevler, New Britain, Conn. MILLSTONE DRESSING MACHINE.—S. Dean et al., La Crosse, Wis. SREW NUT.—W. M. Van Anden, Brooklyn, N. Y.

Recent American and Foreign Patents.

Improved Car Replacer.

John R. Wilds, Brooklyn, N. Y.—This ingenious invention is something which is much needed upon city horse car lines, where it is a daily occurrence for cars to run off the track, causing vexatious delays to the passengers and very severe work to the horses. The device is simply an iron plate grooved beneath to fit the rail, and having flanges to secure it thereto. From the middle of the replacer an irregular shaped groove inclines downward to the rail in each direction. The plate extends over the outside of the rail, and has two oblique channels which intersect the grooves. This part of the replacer is supported on the pavement. The channels extend from the center of the replacer, and incline downward in each direction so as to terminate at the bottom outside of the "tread" of the rail, to receive the flange of the wheel of the displaced car, and to conduct it up to the center, and then down the longitudinal groove to the rail. By slightly modifying the form of the grooves and flanges on the under side to fit to the rail, the displaced wheel between the rails may be replaced in the same manner. The invention may be applied to the rails of either horse cars or to the T rails of locomotive roads.

Improved Watchmaker's Tool.

Julius F. Young, Watonau, Minn.—The object of this invention is to furnish means for reducing the tension and elasticity of hair springs of watches, so as to vary the time or action of the watch movement from fast to slow, as may be desired. There is an adjustable rest, which is designed to hold between it and a stationary stand any diameter of watch balance wheel with the hair spring and parts connected therewith. This rest is adjusted by a finger screw. The balance wheel with the hair spring being thus confined, the end of the hair spring is taken hold of with a pair of pliers and is gently drawn along under spring clamps which are screwed down. These hold the hair spring flat to the bed, so that, with a scraper of any suitable kind, the hair spring may be reduced so as to alter the running of the watch from five minutes to an hour and a half in twenty-four hours. When the clamps are raised, the hair spring is allowed to slip back by its own tension, so as to assume its former diameter, and is readily recoiled.

Improved Hog Trap.

James M. Overshiner and George M. Overshiner, Elwood, Ind.—This is an improved trap for catching and holding hogs. In using the trap, the ends are opened; and the hog being driven into the trap, the lower end of a lever is moved outward to open a space large enough for the passage of the hog's head. As the hog attempts to escape, the lower end of the lever is moved inward, clamping the hog's neck and holding him securely, a pawl locking saddle lever in place. The hog can now be conveniently operated upon as desired, there being suitable devices for placing the animal in proper position.