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## VALEDICTORY FOR VOLUME I.



THIS is the last number of the first volume of our "new series;" and our friends will be pleased to learn that the costly experiment of enlarging the size of our paper, without increasing the price, is being attended with the most satisfactory success.

We exchange with French journals of a character somewhat similar to that of the SCIENTIFIC AMERICAN, the price of which is eight times as much as that of our journal, in proportion to the amount of reading matter, though they have few or no illustrations. Where education is limited to a small class, the circulation of periodicals must be small, and the price must be high in order to sustain them; but, in this country of universal education, experience has shown that the true way to secure the support of a paper is to give it the greatest intrinsic value, to adapt it to the wants of the time, to kindle it with a spirit of life in accordance with the activity of our people, and then to put it at the very lowest possible price in order to give it a very wide circulation. This has been our plan, and experience is constantly teaching us the wisdom of the policy. It must be obvious to all that a journal in every way as well got up as the SCIENTIFIC AMERICAN cannot (at the terms at which it is published) yield much remuneration to its publishers, and can only be sustained by a very large circulation, which, we are happy to announce, it has already secured. While we thank our friends for their past exertions to procure new subscribers, we spur them on to further efforts to swell the list. Let each reader consider what neighbor would be most likely to appreciate our paper, and thus make us a "new year's present" of a new subscriber. Energy! activity! promptness! life!—these are the maxims of the day; and, while we remind our friends of them, we endeavor to act upon them ourselves. We have numerous competent minds constantly watching all departments of science and art, at home and abroad, for the first development of matters of interest to our readers. Rejecting all fiction, selecting only what is authentic and reliable, and culling from among this the most useful and interesting, we present our readers with the very cream and pith of what the human race is learning and doing. We are not surprised, though we are exceedingly gratified, at the appreciation of our labors. With the invaluable possession of all our past experience, with increased means and facilities, and with undiminished energies we are pressing forward in the race, more and more confident of seeing our subscription list soon swell to over one hundred thousand names, and more than ever determined to cause the SCIENTIFIC AMERICAN to be still recognized as the leading one of its class in all the world. In the meantime, we are well satisfied with the readers which we at present have, and we have no doubt that the same pleasant relation will subsist between us which have been manifested hitherto. Never had a paper warmer friends, and never were they more fully appreciated. As you, kind friends, gather around your Christmas fires, with hearts full of gratitude for all the blessings which you enjoy, and especially for the multitude of comforts, conveniences, and luxuries of life with which the genius of our inventors has surrounded you, we heartily wish you all—a "Merry Christmas, and a Happy New Year!"

## A HINT IN REGARD TO STEAM PIPES AND FURNACES.

All men have observed that a northwest wind in this region generally brings clear weather; but the cause of this may not be so universally known, though it is fully ascertained. It results from that property of the atmosphere which produces so many phenomena of the weather, its property of absorbing and retaining more water when it is warm than when it is cold. A northwest wind comes to us from the frozen regions beyond Lake Superior, where the temperature in the winter ranges from 40° to 60° below zero, and where the air has consequently had most of its moisture squeezed out of it; when it reaches the eastern edge of the continent, cold as it is, it is becoming warmer, and its capacity for water is increasing; far from depositing any moisture as rain, snow, or hail, it eagerly drinks in every particle with which it comes in contact; in other words it is a very drying wind. As a general rule, any wind blowing from the North to the South is a dry wind, and causes clear weather, while a wind blowing in the opposite direction produces clouds and rain. There are, however, many exceptions to this; a northeast wind along the western shores of the Atlantic, comes from the warm waters of the gulf stream, which have saturated it with water, and, on reaching the land, its temperature is reduced, though it is moving southerly, and a portion of its water is deposited in the form of rain or snow. On the other hand, as the temperature in summer is nearly or quite as high in New York as it is in Virginia, a southwest wind, as it moves northerly, is not cooled, and it is consequently frequently accompanied with clear weather.

An able and learned French writer, assuming that the Americans are less healthy and robust than Europeans, discovers a sufficient explanation of the fact in the circumstance that we live on the east side of our continent, and the Europeans on the west side of theirs. The Americans consequently being compelled, as the prevailing winds are from the West, to breathe a dry atmosphere, while that which Europeans breathe is properly supplied with moisture. The human lungs and skin seem to be adapted to air containing a suitable supply of aqueous vapor, and when this is diminished considerably these viscera suffer in consequence. The rosy cheeks and redundant health of the English people is no doubt principally owing to the moist atmosphere in which they live, and the proverbial healthiness of sailors, and the inhabitants of small islands, is to be attributed to the same cause.

Now if our winter air, already too dry, is heated from a temperature of 20° or 30° to 65° or 70°, its capacity for moisture is enormously increased, and it sucks in every drop that it touches; it absorbs all that it possibly can from the skin, and comes loaded with it in every breath from the lungs. Furnaces and steam pipes are exceedingly unhealthy, unless ample provision is made for supplying the air with moisture. Since these modes of heating houses have become so fashionable, their effects may be seen in the countenances of large numbers of our population; the first sign that the poison is at work, is a dark ring under the eyes; then follows a sallow color of the whole skin, generally accompanied by a loss of appetite and other symptoms of a disease of the liver, with dyspepsia and general prostration of the system. Or, in persons of a different temperament the effect is felt in a greater sensitiveness of the cold, and greater liability to take cold, especially to cough, followed in more cases than would be supposed, by consumption.

In constructing steam pipes and furnaces, therefore, provision should be made for an abundant supply of moisture to the air. In cases of steam pipes this is easily done by inserting a stop-cock, and allowing the steam to escape directly into the room; with furnaces, broad pans should be kept as near the fire as possible, and kept carefully supplied with water.

## OIL FUEL FOR STEAMERS.

A manufacturer of coal oil has suggested to us the employment of crude distilled material as a fuel for boilers, more especially under those in steamships. The idea is far from being preposterous; it is founded on rational data. The simple question at issue between the use of coal and oil as fuel, either on steamships or under any kind of boiler, is one of economy entirely; and with proper appliances (some of which have yet to be invented) the balance, we believe, will preponderate in favor of the oil. The manufacturer to whom we have alluded in-

forms us that such oil can be made at the mines for eight cents per gallon, and may be delivered on ship-board for ten cents. According to Professor Eaton not less than 140 gallons of crude oil have been obtained from one tun of Breckenridge coal, which, at eight cents per gallon, would yield \$11.20 for the oil, but even at one-half this yield, the profits would be very large at mines, where the coal can be obtained for \$1 per tun. The question, however, naturally arises:—How do oil and coal bear a comparison in ultimate expenditure, when used for fuel? At the first glance the economy is altogether in favor of coal, because the price of a tun at \$5 can only purchase 50 gallons of oil at ten cents each, and as a gallon only weighs nine pounds, if we allow 10 per cent for ashes in the coals, a tun is still about 4½ times heavier than 50 gallons of oil. We have not been able to obtain a correct analysis of the crude oil, but it may be perfectly safe to set down each pound of it as containing twice the amount of hydrogen that is in a pound of coal, and that it is capable of generating twice the amount of steam, at the very lowest estimate, when burned under the same circumstances. But when burned under the most perfect arrangements it should generate 4 times the amount of steam, because one pound of hydrogen burned favorably will raise 250 pounds of water to 180° Fah., while one pound of coal will raise only 55½ pounds of water to the same temperature. It may be safe, however, to set down the oil as only possessing twice the steam-raising power of coal, which would bring the price of 50 gallons at 10 cents each, equal to half a tun of coal at \$5. But there are other considerations in favor of oil which will elevate it higher in the economic comparison. In burning coal in steamships a great number of firemen require to be employed; some are continually feeding the furnaces, while others are engaged in wheeling the lumps from the bunkers and breaking them into the proper size. With oil as a fuel it may be kept in large tanks situated slightly above the level of the furnaces and conveyed in tubes through innumerable minute perforations in soapstone or fire-brick under the boilers, and there burned in the most perfect manner—being fed in by simply turning the cock of the supply pipe. In this manner two firemen will effect the same objects as a dozen feeding in coal to the furnaces. In burning coal also, there is a great waste of heat when the doors of the furnaces are opened to put on a fresh supply, by volumes of cold air being drawn under the boilers. No furnace doors require to be opened in using oil; the amount of it as fuel can be regulated by the simple turning of a cock, and as it forms no ashes the draft of air can be regulated in the most perfect manner to produce complete combustion and prevent a waste in this respect which always attends the use of coal in most boilers. As one half the weight of coal will only be allotted, another saving will be effected in the space required for the oil stowage, and therefore one half the room required for this purpose may be devoted to useful paying cargo. In loading up with oil one half the expense may also be saved for labor, as oil can be run down into the tanks by its own gravity. On the whole, it appears to us that cheap coal oil may be used as a substitute for coal, and a saving of at least 20 per cent effected, or \$200 in a voyage from New York to Liverpool. An objection might be urged against its use for this purpose on account of its pungent odor, but this, we think, may be obviated by judicious arrangements, and a still greater saving effected than we have yet hinted at. The field at least, is one open for experiment and promises to yield profitable returns both as it relates to the invention of improved arrangements for burning and using the oil as a fuel.

**BINDING.**—We are having made a large quantity of very handsome covers for the first volume of the new series of the SCIENTIFIC AMERICAN; they will be ready for delivery about the 1st of January. The designs for ornamenting the covers were executed expressly for this publication, and are chaste and appropriate. The style of the binding we have changed entirely from our former designs, and while the price charged will not be so great, the binding will be superior and sufficiently ornamented for a parlor table or a New Year's gift. The prices we shall charge for binding will merely cover the cost, so as to induce our patrons to send their sheets for binding, or to send to us for the covers, and then have them bound in their own neighborhood, so that a uniformity of style and quality may prevail throughout. Our prices will be as follows:—For binding, muslin, 50 cents; for covers, sent by express or delivered at the office, 40 cents; for covers sent by mail, 50 cents.