Relation of the Air to Clothing.

The following statements of general interest are specially reliable, being contained in a lecture by Professor Pettenkofer, of Munich, who is known as high authority on such subjects:—Although the warmth of the body is the result of respiration, it is a singular fact that the normal temperature of the blood of the African is the same as that of the Esquimaux, or about 99½°, while the air surrounding them, and inhaled by them, may differ as much as 180° in temperature; neither does this temperature vary, in a state of health, more than two degrees, though the temperature of the air may vary 72°. The heat generated by the human body in twenty-four hours is sufficient to raise thirty quarts of water to the boiling-point; and of this the regular processes of nutrition require only a definite part, and the larger portion must be given off through radiation, evaporation, or conduction. When heat is lost by radiation, as in sitting near a cold window, or other cold object, the impression of a draught may be created, although the air be perfectly calm, heat being simply given up to the colder object. Thus, while the temperature of a room may remain constant, different sensations may be experienced, dependent on the surrounding objects. A much larger amount of the superfluous heat is lost by evaporation; and during severe exercise, when more heat is developed, evaporation is also more rapid, and the normal temperature of the blood restored. A "cold" is caught when the evaporation is too rapid. But little heat is lost by conduction. The particles of air in contact with the body become warm, and are replaced by colder ones, creating a current, which is insensible, because of less velocity than three feet per second. In better conductors cooling takes place more rapidly, water of 61° seeming much colder than air of 61°. These three modes of cooling, however, supplement each other, and act together. Thus a current of warm air cools more rapidly than calm cooler air, not only by reason of renewal of the air, but by favoring evaporation.

The chief object of clothing is to surround the body artificially with a warm climate, poor conductors being consequently selected. The cooling process is, however, simply checked by the clothing. Even the thinnest, finest fabric, as a veil, diminishes loss by radiation. But the inclosure of air is especially effective, and consequently garments of porous heavy material are warmer than those which are more compact. Felt shoes, permeable to air, are warmer than leather or india-rubber ones, while the latter soon become unendurable because of checked ventilation. The more hygroscopic the material, the colder the clothing, because it is a better conductor when moist. Linen and silk are for this reason colder than wool, and also because the latter retains its elasticity when moist, and keeps the air within its pores. And our bed, which is, in fact, our sleeping garment, is of special interest. It must be warmer than our waking clothing, since less heat is developed during sleep. Consequently loss of sleep is very exhausting. The feather-bed possesses in the highest degree feeble conducting power, elasticity, and permeability to air; but, if too thick or soft, resembles more an air-tight garment. The house, too, may be regarded as any extended piece of clothing, so gradual is the transition from bodily garments to it (the step from the wide garment of the Arab to his felt tent being a small one), and, in hygienic functions, they agree precisely in regulating our relations with the surrounding air. The ease with which a current of air may be blown through a brick, pieces of mortar, wood, etc., by glass tubes cemented to opposite sides, and the passage of water (so much denser) through these substances, show how imperfectly our walls, of whatever material, and however thick, exclude the air from us. We do not perceive the free passage of air through them because the current is too slow.—EDITOR'S SCIENTIFIC RECORD, in *Harper's Magazine for October.*

Ethcis of Christianity.

The superiority of the Christian code is practically acknowledged, and often confessed, in a most significant way, by the mode in which the enemies of Christianity taunt its disciples. When they speak of the vices and corruptions of the heathen, they blame and justly blame, the principles of their vicious systems, and ask how it could be otherwise. When they blame the Christian, the first and last thing they usually do is to point in triumph to the contrast between his principles and practice. "How much better," say they, "is his code than his conduct!" It is as a hypocrite that they censure him. It is sad for him that it should be so; but it is a glorious compliment to the morality of the New Testament. Its enemies know not how to attack its disciples except by endeavoring to show that they do not act as it bids them. Surely this uniform excellence of the Christian ethics, as compared with other systems, is a peculiarity worth nothing, and utterly incomprehensible upon the hypothesis that it was the unaided work of man. That there are points on which the moral systems of men and nations *osculate* is most true; that there should have been certain approximations on many most important subjects was to be expected from the essential identity of human nature in all ages and countries; but for their deviations in some point or other—usually in several—from what we acknowledge to be both right and expedient is equally undeniable. That when such men as Plato and Aristotle tried their hands upon the problem they should err, while the writers of the New Testament should have succeeded—that these last should do what all mankind besides had in some points or other failed to do is sufficiently wonderful; that Galilean Jews should have solved the problem is, whether we consider their age, their ignorance or their prepossessions, to me utterly incredible.

It was George Herbert who said a handful of good life is worth a bushel of learning.

Comets.—Their Character and Source.

The spectroscope shows that comets consist of a mass of carbon dust, so diffused as to make them bulky with a little weight, and this explains at once the cause of the total absence of refraction of the light freely passing between these minute dust particles.

In regard to the question "whence these masses of dust particles came," Zollner, whose observations and calculations we mentioned in a former article on the sun, holds that the solar eruptions throw up masses, consisting chiefly of hydrogen, ejected from the sun with a velocity of 188 miles per second. He comes to the conclusion that as thrice this velocity would carry material entirely beyond the limits of solar attraction, a somewhat less velocity would throw it to distances corresponding to those of the comets. He thinks, therefore, that comets originate from the sun, and are thrown out from that body finally to return thereto, just as volcanic material is thrown out from the earth and carried through our atmosphere, eventually coming down at remote spots.

Any doubt in regard to the possibility of the existence of such enormous projectible forces is removed by the actual observations of Janssen, Lockyer, and Respighi. The latter says: "The solar surface is the seat of movements of which no terrestrial phenomenon can afford any idea; masses of matter, the volume of which is many hundred times greater than that of our earth, completely change their positions and form in the space of a few minutes, showing motion of which the velocity is measured by hundreds of miles in a single second." Professor Young has observed a solar explosion of which the mean velocity, between the altitude of 100,000 and 200,000 miles above the solar surface, was 166 miles per second; as this indicates an initial velocity of 200 miles per second, it is sufficient to carry the projected matter beyond the orbit of the earth.

Schiaparelli, in the *Astronomische Nachrichten*, calls the comets "cosmical clouds." He says; "Cosmical clouds will always appear to us as comets when they pass near enough to the earth to become visible." The comparison is indeed striking; as watery clouds ascend in our atmosphere and float around the earth, so the fiery clouds from the solar surface ascend into planetary space and float around as comets. Both are raised by solar heat and are afterwards cooled.

It is possible that the hydrogen in the solar protuberances is at first so abundant that its spectrum overcomes the spectra of the other materials which it may hold, as it were, in solution; and that while being projected, it expands by its gaseous nature in the planetary space, leaving the carbon and other materials, as a mass of dust which slowly disintegrates by the disturbing influence of the solar heat, planetary attractions, and adhesion of the different particles, forming finally great numbers of small and dense masses, which will fly around the sun in the form of a belt; and when some of them at last come down upon the earth, we call them meteors. Schiaparelli further says: "Gradually the products of disintegration are distributed along the comet's orbit; and if the earth's orbit cuts this, the phenomena of shooting stars are produced."

Two interesting facts are connected with these views; one is that the position of some well determined meteor streams coincides with the orbit of a comet; the other fact is that recently chemists have extracted hydo-carbon from meteoric masses: indicating the hydrogen with the spectroscope shows to exist in excess in the solar protuberances, and the carbon which the same instrument shows to exist in excess in the comets.—*Scientific American.*

Milk as Medicine.

The London *Milk Journal* says, on the authority of Dr. Benjamin Clarke, that in the East Indies warm milk is used to a great extent as a specific for diarrhœa. A pint every four hours will check the most violent diarrhœa, stomach-ache, incipient cholera, and dysentery. The milk should never be boiled, but only heated sufficiently to be agreeably warm, not too hot to drink. Milk which has been boiled is unfit for use. This writer gives several instances to show the value of this substance in arresting this disease, among which is the following. The writer says: "It has never failed in curing in six or twelve hours, and I have tried it, I should think, fifty times. I have also given it to a dying man, who had been subject to dysentery eight months, latterly accompanied by one continual diarrhœa, and it acted on him like a charm. In two days his diarrhœa was gone, and in three weeks he became a hale, fat man, and now nothing that may hereafter occur will ever shake his faith in hot milk. A writer also communicates to the *Medical Times and Gazette* a statement of the value of milk in twenty-six cases of typhoid fever, in every one of which its great value was apparent. It checks diarrhœa, and nourishes and cools the body. People suffering from disease require food quite as much as those in health, and much more so in certain diseases where there is rapid waste of the of the system. Frequently all ordinary food in certain diseases is rejected by the stomath, and even loathed by the patient, but nature, ever beneficent, has furnished a food that in all diseases is beneficial—in some directly curative. Such a food is milk. The writer in the journal last quoted, Dr. Alexander Yale, after giving particular observations upon the points above mentioned, viz: its action in checking diarrhœa, its nourishing properties, and its action in cooling the body, says: "We believe that milk nourishes in fever, promotes sleep, wards off delirium, soothes the intestines, and, in fine, is the *sine qua non* in typhoid fever." We have also lately tested the value of milk in scarlet fever, and learn now that it is recommended by the medical faculty in all cases of this often very distressing children's disease. Give all the milk the patient will take, even during the period of greatest fever; it keeps up the strength of the patient, acts well upon the stomach, and is in every way a blessed thing in this sickness.

Elihu Burrit on the St. Lawrence.

But what is "the gallant Forth" or "Father Thames," the Rhine or the Nile, to the St. Lawrence, or the river of any continent to compare with it for its commercial capacities, its affiliations and connections?

Let us descend into the public garden, and from one of the seats under the shadow of the twin-faced monument erected to the joint memory of Wolfe and Montcalm, look off upon the scene below. The river spreads out before us a perfect cross. The St. Charles on one side, and the broad arm of the great river put out on the other, around the Isle of Orleans, made a traverse at right angles with the main or direct current. Looking northward, between the masts of the great timber ships at anchor, you see the smoke and red funnel of an ocean steamer approaching. It comes up slowly and softly, with hardly a ripple at its bows, to the pier under the citadel, that looks down upon it from its lofty height as upon a mere river yacht in size.

Yet that steamer registers 3,000 tons, and is only one of nearly thirty that stop at this port on their way to and fro across the ocean. These suggest, but do not measure, the capabilities of this river. Let us supply a standard that may help us to a better conception of them. Suppose that Sandy Hook were the Straits of Belle Isle, and the Hudson were the St. Lawrence in length and volume. Then, to be at an equidistance with Quebec from the sea, New York should be at Buffalo, and Albany at Detroit; and this last point would not be the head, but the scant half-way mark, of the navigation of the river. This will help us to realize its capacity. Keeping this measurement in view, remember that Montreal is not half-way even in the navigable length of the river. From that port, through nearly 1,000 miles from the ocean, the navigation of the St. Lawrence extends 1,400 miles. The continuity of its navigation from Duluth, on Lake Superior, to the Straits of Belle Isle, nearly twenty-four hundred miles, is complete. In the vital relationship that nature intended, the St. Lawrence is the jugular vein of all those great American lakes and rivers that feed them. Commercially, it sustains, or was created to sustain, this relation and function to the best half of the continent, as may be seen from another point of view.

Thus, there is no river on the American continent that approaches the commercial importance and value of the St. Lawrence to England and Europe generally. Its capacity and value are in the very infancy of their developement; but in a few years they will show the world what they are and may be. It is only just beginning to be utilized in the sense applied by John Quincy Adams to the Falls of Niagara—as a river provided by nature for two nations to share alike as their common roadway to the ocean. As such a road, both have the same interest to free it from all obstructions to the passage of their sea-going ships. Both separately or jointly can do this. Jointly, what could they not do? If a Suez Canal were needed around Niagara Falls, or around any other rapids of the river, the two countries might make it the most profitable work of international partnership ever accomplished. What a fitting memorial of the great consummation of the Washington Treaty such a joint work would be! What would better grace the "new departure" of the two nations taken at Geneva than the sight of files of ocean steamers floating their flags from the head of Lake Superior down the St. Lawrence to the sea! Looking across to the three immense forts which the Mother Country in constructing with her own money on the opposite ridge above Point Levis, one cannot but regret that she did not give it to the widening and deepening of the Welland Canal, or to a work of like utility, in which her own people might share equally with the Canadians without lessening the benefit the latter might derive from it. In a word, there is no river in India, or in any other region of the globe under the British Crown, of such commercial value to England as the St. Lawrence.

Arctic Regions.

The 80th of a series of papers on the progress of geographical research in the polar regions, published by Dr. Petermann in his *Mittheilungen*, contains a *resume* of what is known from all sources respecting the American polar expedition under the late Captain Hall, and is accompanied by an elaborate map, in which the results of this expedition, as far as these are known, have been critically compiled, together with the *data* of the former voyagers, Kane and Hayes. The story of the Polaris voyage is already well known in England, and no fresh tidings of the ship, which wintered, 1872-73, with the ten remaining members of the company on the coast of Northumberland Island, in lat. 77° 20 N. in Baffin Bay, have reached us since autumn of last year. Two vessels, however, generously sent by the American Government, have for some time been on their way northward to find and succor the Polaris crew.

In his remarks on the general results of this voyage, Dr. Petermann draws a remarkable contrast between the advances made by the various expeditions which have been undertaken in steam vessels, and by those in which sledge travelling has been tried; maintaining that, since Hall's expedition had shown that there is no such thing as a permanent covering of ice in this branch of the Polar Sea, sledge travelling is little to be depended on, and steamships should alone be employed. The discovery of drift wood on the shores of Hall Land (the east coast of Robeson Strait, between 81° and 82° N.) makes it not improbable, Dr. Petermann believes, that the land breaks up here into an archipelago of islands, or at least there is communication by which Asiatic drift-wood finds its way hither; and on the other hand the presence of numerous musk oxen, in these regions makes it very probable that Hall Land is in uninterrupted connection with the coast of East Greenland in lat. 77° N., explored by the second German expedition in 1870-71. —*Academy.*

Homekeeping Versus Housekeeping.

The truest homes are often in houses not especially well kept, where the comfort and happiness of the inmates, rather than the preservation of the furniture, is first consulted. The object of home is to be the center, the point of tenderest interest, the pivot on which family life turns. The first requisite is to make it attractive, so attractive that none of its inmates shall care to linger long outside its limits. All legitimate means should be employed to this end, and no effort spared that can contribute to the purpose. Many houses called homes, kept with waxy neatness by painstaking, anxious women, are so oppressive in their nicety as to exclude all home-feeling from their spotless precints. The very name of home is synonymous with personal freedom and relaxation from care. But neither of these can be felt where such a mania for external cleanliness pervades the household as to render everything else subservient thereto. Many housewives, if they see a speck on floor or wall, or even a scrap of thread or bit of paper on the floor, rush at it, as if it were the seed of pestilence which must be removed on the instant. Their temper depends upon their maintenance of perfect purity and order. If there be any failure on their part, or any combination of circumstances against them, they fall into a pathetic despair, and can hardly be lifted out. They do not see that cheerfulness is more needful to home than all the spotlessness that ever shone. Their disposition to wage war upon maculateness of any sort increases until they become slaves of the broom and dust-pan. Neatness is one thing, and a state of perpetual house-cleaning quite another.

Out of this grows by degrees the feeling that certain things and apartments are too good for daily use. Hence, chairs and sofas are covered, and rooms shut up, save for special occasions, when they are permitted to reveal their violated sacredness in a manner that mars every pretence of hospitality. Nothing should be bought which is considered too fine for the fullest domestic appropriation. Far better is the plainest furniture, on which the children can climb, than satin and damask which must be viewed with reverence. Where anything is reserved or secluded, to disguise the fact is extremely difficult. A chilly air wraps it round, and the repulsion of strangeness is experienced by the most insensible.

There are few persons who have not visited houses where they have been introduced to what is known as the company parlor. They must remember how uncomfortable they were while sitting in it; how they found it impossible to be at ease, and mainly for the reason that their host and hostess were not themselves at ease. The children were watched with lynx eyes, lest they should displace or soil something; so that the entertainment of friends became very much like a social discipline. They must recall, too, how sweet the fresh air seemed out of doors, and how they inwardly vowed, in leaving that temple of form and fidgetiness, that something more than politeness would be required to incite them to return.

Home is not a name, nor a form, nor a routine. It is a spirit, a presence, a principle. Material and method will not, and cannot make it. It must get its light and sweetness from those who inhabit it, from flowers and sunshine, from the sympathetic natures which, in their exercise of sympathy, can lay aside the tyranny of the broom and the awful duty of endless scrubbing.—"*Home and Society*," *Scribner's for October.*

Try the Cracker First.

Ralph Wells describes in a recent letter to the teachers of Grace Mission, how he met in the Alps a huge shepherd dog. It illustrates very pleasantly the gentle way of doing things, and it will apply just as well in our dwellings with rough girls and boys.

"We had hardly started, when a shepherd dog, seeing one abroad at so early an hour, concluded that something is wrong, and blocks the way, the only way, and a very narrow one at that. Now it is known that we are very fond of dogs; but to see that Swiss dog's hair rise, and those Swiss teeth shown, and to hear the low, resolute growl that implies "no passage here," is too much for Yankee pluck even on the Fourth of July! Two ways suggested themselves out of the difficulty. The first is a stone; the second a cracker. The latter is first tried. "Doggie want a cracker?" Presto, change! down goes the hair, in go the teeth, wag goes the tail, and with a sweet smile on his face, doggie goes off to eat his cracker. Try the cracker first, teacher."

Hints to Night-watchers.

A person who is sick enough to need night-watchers needs rest and quiet, and all the undisturbed rest he can get. If one or more persons are in a room reading, talking, or whispering this is impossible. There should be no light burning in the room unless it be a very dim one, so placed as to be out of sight of the patient. Kerosene oil should never be used in the sick room. The attendant should quietly sit or lie in the same room, or, what is usually better, in an adjoining room, so as to be within call if anything is wanted. It is a common practice to wake patients occasionally for fear they will sleep too soundly. This should never be done. Sleep is one of the greatest needs of the sick, and there is no danger of their getting too much of it. All evacuations should be removed at once, and the air in the room kept pure and sweet by thorough ventilation.—*Herald of Health.*

Libertines in theology have ever shown a signal zeal in hastening to welcome attacks upon the integrity of the records of inspired revelation. They have gladly opened the gates when they could, either to crafty spies or to organized bands intent on mischief, and then have entered into alliance with the professed enemies of the faith for the purpose of substituting a series of speculations that shall claim the name and have none of the authority of the Divine truth contained in the sacred Scriptures.—*Intelligencer.*

Scientific and Useful.

IS PHOSPHORUS THOUGHT?

There appears still to be much difference of opinion among chemists about the changes which occur in the secretion of the kidneys after waste of nervous tissue. For example, Dr. L. Hodges Wood, as the result of his observations in 1859, denied the correctness of the generally received statement that the amount of phosphates in the urine is increased by fatiguingmental exercise. He found that, while the alkaline phosphates were slightly increased, the earthy phosphates were notably diminished after mental work, and that, when the mind was not much employed, the excretion of earth phosphates was increased instead of diminished. He accounts for this on the hypothesis that, when the brain was worked, it withdrew more phosphorus from the circulating fluid.—*Medical and Surgical Reporter.*

TESTING WATER.

An English technical periodical points out an easy way of testing whether water is good and fit for general use. It says:—"Good water should be free from color, unpleasant odor and taste, and should quickly afford a lather with a small portion of soap. If half a pint of the water be placed in a perfectly clean, colorless glass-stoppered bottle, a few grains of the best white sugar added, and the bottle freely exposed to the daylight in the window of a warm room, the liquid should not become turbid, even after exposure for a week or ten days. If the water becomes turbid, it is open to the grave suspicion of sewage contamination; but if it remain clear, it is almost certainly safe. We owe to Heisch this simple, valuable, but hitherto strangely neglected test."

THE INSTINCT OF ANTS.

An observer of the habits and instincts of ants relates that a vase on the mantelshelf in his sitting-room, which was usually filled with fresh violets, was haunted by very small red ants. The insects issued from a hole in the wall above, and gradually increased in number until they formed an almost unbroken procession. He brushed them to the floor for several days, but as they were not killed, the result was that they formed a colony in the wall at the base of the mantel, and, ascending thence to the shelf, the vase was soon attacked from above and below. "One day," says the writer; "I observed a number of ants, perhaps thirty or forty, on the shelf at the foot of the vase. Thinking to kill them, I struck them lightly with the end of my finger, killing some and disabling the rest. The effect of this was immediate and unexpected. As soon as the living arrived near where their fellows lay dead and suffering, they turned and fled with all possible haste. In half an hour the wall above the mantelshelf was cleared."

HOW SMOKING TOBACCO IS PREPARED.

The tobacco as it comes from the plantation is dried to the utmost, and passed through a mill in which a revolving cylinder armed with small projections grates it into tiny particles. It is then by the same machine sifted through a series of sieves similar to those of a wheat fan, that which is left on the upper and coarser sieves being passed and repassed through the mill until sufficiently fine for use. For this it is unnecessary to stem the leaves, the refuse stems being themselves used in the manufacture of the inferior grades, and the sweepings of the stemming-room are devoted to a like purpose. These last are first carefully examined, to make sure that nothing is left in them to break the mill, no nails or stones to injure the machinery. A man on his hands and knees was picking over a pile of sweepings the day we visited the factory, seeming as intent on his task as the searcher for pearls in the oyster pits of Ceylon. The inferior grades of lugs, etc., can be used only for smoking. Indeed, no leaf is worthless for the manufacture of one or another of the innumerable brands somewhere between the golden chaff with which the millionaire fills his costly meerschaum and the black mixture which Paddy smokes in his clay pipe as he drives his dray—there is place and use for it all. Smoking tobacco is generally put up in bags holding from two ounces to one pound each, a pound being the limit allowed by Government for any single package. The packing is done by means of hollow iron cylinders, over which the bags fit closely and are tightly drawn. Into these the tobacco is poured, and by working a treadle a wooden mallet is forced into the cylinder, compressing the mass into the smallest possible compass. This operation is repeated until the bags are full, when the cylinders are withdrawn, leaving the closely packed tobacco in the bag. The number of bags required for this business may be imagined from the fact that in the single factory visited by the writer their manufacture furnishes support for fifteen poor families, besides which a large number are made by persons who merely do the work as a source of pocket-money. The manufacture of tobacco is the principal industry of Richmond, outstripping even iron in the revenue which it produces. The largest income listed last year in the State of Virginia was that of a Richmond tobacconist, and what the Bourse is to Paris, the Stock Exchange to New York, that the Tobacco Exchange is to Richmond.—From "In a Tobacco Factory," by Mrs. M. P. HANDY, in *Harper's Magazine for October.*

CHIP MANURE.

Perhaps no greater injury has ever been done in horticulture than the recommendation by inexperienced writers of *chip manure* as a dressing. Its danger arises mainly from its ready disposition to spread fungi, which inevitably arise in soils naturally a little moist and tenacious. When once formed, such fungi spread with astonishing rapidity, totally preventing growth, and finally killing the plants.—*Horticulturist.*

COAL FIELDS IN CHINA.

The most accurate estimates state that China possesses coal-fields to the extent of over 400,000 square miles, one Province (Shansi) having no less than 31,000 square miles with veins from 1½ to 31 feet in thickness.