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OLD SERIES]

Nec aranearum sane lectus ideo melior, quia ex se fila gignunt, nec noster vilior quia ex alienis libamus ut apes.

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NATURE'S PROVISION FOR THE WINTER SEASON.

When fish-ponds, or other small collections of water, are completely frozen over, it must not be supposed that the fish live very comfortably at the bottom in their 40° temperature. They can stand the cold very well, perhaps as well as the warmth of summer; but, like the human being shut up in a close room, they are poisoned by their own breath. The wintry sun is too feeble, after its passage through the ice, to exercise much influence on the aquatic plants, which would otherwise decompose the carbonic acid; and this accumulating, would prove fatal to the fish, if we did not break holes at the surface to admit the air, and let out the mephitic vapor. On this friendly service being rendered, the fish are seen rushing up to the aperture, as the dancers in a crowded room, when the exhalations become stifling, fly to the open window to gasp. They often rush to their own destruction; for the fishermen know what they are about.

Nature is as beneficent as man on such occasion and less selfish. Although the ice on a large pond or lake prevent the admission of heat from the top, and would, therefore, become of a uniform thickness, there are agencies at work below to counteract the danger. The springs by which the lake is fed, coming from the comparatively warm earth, throw up a column of water, which gradually thaws the ice on the surface, or renders it thin enough for the fainting fishes themselves to throw open their wash. When the cold is too intense for this process—when the very springs are frozen, and the covering of the ice rests like a sheet of solid iron on the lake—what becomes of its inhabitants? The earth unable to emit, exercises its power in attracting water into its bosom and thus a vacuum is formed beneath the ice, which unable longer to sustain the weight of the superincumbent atmosphere, gives way, and admits air, and light, and life into the waters beneath. Were it not for their danger of suffocation, the fishes in keen frosts would be better off as regards temperature, than land animals; and indeed, persons who have accidentally fallen through the ice usually remark that the water felt much warmer than the air.

When the air is in zero, a warm vapor rises through a hole broken in the ice, and condenses into crystals so minute, that they have the appearance of smoke. In like manner the vapor from our lungs becomes visible on a frosty day; and in cold climates, such as that of Lapland, when a blast of air is suddenly admitted into a room, the breath of the inmates turns into snow. Another beautiful and less obvious effect of condensation is seen in the footprints of men and animals in a field. These are covered in some cases, with a thin sheet of ice, and in others with a delicate network of frost; but in neither is there found a single drop of water in the cavity below—the hard surface crumbling into powder beneath our feet. The explanation of chemistry is, that the water which originally filled the footprints, was wholly or partially frozen on the surface, and the remainder sucked by capillary attraction into the earth.

Snow is supposed to be formed by the gradual congelation of the thin watery vapor in the upper regions of the air. As this becomes solidified, it descends to the earth by the natural law of gravitation; and, if immediately examined with a high magnifier, exhibits crystals with figures as regular and beautiful as those of a kaleidoscope. Snow as well ice is a bad conductor of cold; and as a covering of the latter preserves the water beneath at a temperature in which fish can live, so the snowy mantle with which winter wraps the fields, protects the seeds and roots from the killing frost. Snow is actually "given like wool," as the Scripture says; and not only as regards whiteness but warmth; for the fleecy cover-

ings respectively serve the same purpose both for plants, and men, and animals. Under the surface the temperature of snow is little colder than 32 degrees, while above it is not unfrequently 20 to 15 deg., add thus wheat will continue growing beneath at a time when every blade would be killed that was exposed to the air. This accounts for the phenomena of spring in northern countries, when the plants are no sooner released from their covering of snow than they burst suddenly into strength and beauty; and this, although the temperature of the region during the winter was many degrees below zero.

Hail is supposed to be formed from the sudden congelation of rain drops: but, unlike snow, it is found in all the other seasons as well as winter, and we have already had occasion to describe it.

We have already shown how the lives of fish are preserved throughout the severest frosts of winter; but the same care extends to the whole organized creation. Exceptions sometimes occur—just to remind us of the rule; the sap of a tree, for instance, as we have already remarked, is frozen, and as it expands, the trunk explodes, and is rent in pieces. What, then, becomes, in ordinary cases, of the tender buds, from which new leaves are to issue in the following spring? The chemist has discovered that in autumn they are covered with a resinous substance which protects them from frost, and in this state of security the tree goes to sleep for the winter. And this is not a figurative expression; for it is a true sleep, in which the functions of the tree are suspended, and in which it may be removed from its native soil without injury. The provision here mentioned is made only in the case of the trees and shrubs that require it; in the tropical regions, where it is unnecessary, there is no such thing. That the tree is not "dead but sleepeth," is proved by these very buds thus wrapped up in their winter coverings; for if you cut off one of them, and hang it to the branch during the severe frost, it will be frozen through, while its living brethren remain uninjured. We may even say that during this vegetable torpidity there is mystical process preparation going on for a new term of active existence. How else can we account for the fact, that after an unusually late spring, the plants rush forth to leaf, and flower with a rapidity that appears to bespeak some principle within which is impatient of delay? It would seem as if the plant knew its season, and was in haste to make up lost time! In regions where the summer is extremely short, this adaption is still more wonderful. In Siberia, according to a well-known register, the snow and ice begin to melt on the 23d June; on the 1st of July the fields are clear, by the 9th they are quite green; by the 17th the plants are at full growth, and by the 25th in flower; by the 2nd of August the fruit is ripe; and by the 18th the reign of snow is resumed.

Similar to the protection afforded to the buds of trees, but still more wonderful, is the glutinous matter, which at this season, covers the eggs of various insects. This is insoluble by all the rains, and unchanged by all the frosts of winter. Such eggs have been exposed to a temperature of 22 deg. below zero, and then the substance within found in a liquid state, and wholly uninjured. The mucous with which the garden-snail surrounds itself in its winter quarters has properties of a similar kind, but the fur with which various caterpillars are clothed as the cold weather advances, is perhaps, a still more curious provision of nature; associating them in this respect with the larger animals, whose coat of hair become thick, and on the approach of the hyperborean snow. The white color of these winter coats, however, although we cannot dwell upon it here, is a subject more within the province of chemistry. White is said in common parlance, to be a cold color, but that means that it does not radiate heat freely; and thus although its power of absorbing warmth from the surrounding atmosphere may be small, it is the best calculated to

retain the heat generated in the bodies of the animals by the vital principle.

Man has no provision of this kind, no instincts of hybernation. Naked and helpless comes into this world, with no defence against the seasons, and no armour against enemies. He is not a species—although the vulgar fellow this classification of the old naturalists—but a genus distinct, alone supreme. By means of the reason with which the Almighty has endowed him, he adapts himself to all circumstances, invents artificial weapons, makes the lower animals his slaves, or his food, and wrests from external nature the means of subsistence, comfort, and enjoyment. Wherever he finds or can transport the materials with which he works, he is at home. With this condition he is as much at home on the shores of the Frozen Sea as the polar bear—as much at home as the embryo in its egg, which no cold can kill—as much at home as the hibernating snail in its elaborated sarcophagus.

It is familiar to the experience of us all, that during keen frost we eat more than in hot weather; and this would seem to be as natural as that we should desire to wear heavier clothing. Our food is not intended merely to form bone and muscle, or supply the physical waste of our bodies, but likewise to keep up the vital heat; and for this reason it is not uncommon for an Esquimaux, within the polar circle to eat twenty pound of salmon at a meal without special injury. What this vital heat, may be, chemistry has not ascertained; but at the present moment great excitement prevails in the scientific world, from the idea that stupendous discoveries are on the eve of being made, which will connect, if not identify, various unexplained phenomena with electricity. The dryness of the atmosphere in the polar regions may be supposed to be the great cause of the electricity of spirits, and regularity of health, maintained there even by natives of temperate climates. At home, in much less degree of cold, wet feet occasion disease; and they are supposed to do so because the water acts as a powerful conductor, and cause a sudden loss of the electricity with which our bodies are charged, and the due equilibrium of which is necessary for the maintenance of health. The use of flannel next the skin, summer and winter, is explained in the same way by the absorption of moisture, and by the wool of which it is made being a non conductor. But science, however wonderful its discoveries may seem to our ignorance, has not much to do; when men are better chemists their residence on the earth will be both longer and happier.

AGRICULTURAL HYMN.

Great God of Eden! 'twas thy hand
First clad earth in bloom,
And shed upon the smiling land
Nature's first rich perfume.
Fresh at thy glance the flowers sprang,
Kissed by the sun's first rays—
While plain, and hill, and valley rang
With life, and joy, and praise.

God of the Clouds! thy hands can ope
The fountains of the sky,
And on the expectant thirsty crop
Pour down the rich supply;
The farmer, when the seed-time's o'er,
Joys in the mercies given—
Thinks on thy promised harvest store,
And, smiling, looks to Heaven.

God of the Sheaf! to thee alone
Are due our thanks and praise,
When Harvest's grateful labor's done,
On Plenty glad we gaze:
Then shall our thoughts on Heaven rest;
Thy grace we will adore,
And thank that God, whose mercies bless
Our basket and our store.

BUTTER PRESERVED BY BOILING.

A Physician who has travelled through Switzerland describes a process of preserving butter as adopted in that country, and which he states to be far prefer-

able to the English plan of salting. The process is as follows:—Into a clean copper pan (better, no doubt, tinned) put any quantity of butter, say from 20lb. to 40lb., and place it over a gentle fire, so that it may melt slowly; and let the heat be so graduated that the melted mass does not come to boil in less than two hours. During all this time the butter must be frequently stirred, say once in five or ten minutes, so that the whole mass may be thoroughly intermixed, and the top and bottom change places from time to time. When the melted mass boils, the fire is so regulated as to keep the butter at a gentle boil for about two hours more, the stirring being continued but not necessarily so frequently as before. The vessel is then to be removed from the fire and set aside to cool and settle, still gradually; this process of cooling is supposed also to require about two hours. The melted mass is then while still liquid to be carefully poured into the crock or jar in which it is to be kept. In the process of cooling there is deposited a whitish cheesy sediment, proportioned to the quantity of butter, which is to be carefully prevented from intermixing with the preserved butter.—The gaseous grounds are very palatable and nutritious, and are constantly used as food. Butters so prepared will last for years perfectly good, without any particular precaution being taken to keep it from the air, or without the slightest addition of salt.

From the Farmer and Mechanic.

SWEETENING BUTTER.

Mr Trevelgan has communicated to the Mechanics' Magazine the following item of dietetic improvement. Whilst making some experiments it occurred to him that butter, either fresh or salt, possessing a disagreeable effluvia and flavor, might be rendered perfectly sweet by the addition of a little carbonate of soda. On trial this surmise proved correct. The proportions are, carbonate of soda, two and a half drachms to butter three pounds. In making fresh butter the soda is to be added after all the milk is washed out, and is ready for making up. The unpleasant smell is produced by an acid, which being neutralized by the alkali, disperses at the same time the disagreeable flavor. The acid is generated by peculiarities in the constitutions of some cows, by the conditions of certain toddlers, by the length of time the cream is kept before being churned, but too often by the dairy utensils not being kept thoroughly clean. Soda produces the same results when added to the culinary greases—as drippings, lard, &c.

From the Farming Gazette.

CURE OF SCAB IN SHEEP.

I beg to state for the information of all those who may have charge of young stock, that I have tried various receipts, and have found none so effectual as the following, when used properly and made up by a person who understands the mixing of it in the following proportions—

viz.,
4 oz. Corrosive sublimate.
½ oz. Salomonic.
2 oz. Powdered white arsenic.
½ lb. Tobacco, cut small and boiled in
4 or 5 gallons of water.

All the other ingredients are to be mixed with it. Mercurial ointment mixed with six times its weight of lard, is also effectual, but it colors the wool wherever it is applied; in addition, it is tedious and expensive, for which reasons I do not approve of it. The former receipt I can recommend, and if sufficient care be taken in the mixing of it, it is sure to kill the scab wherever it is applied; but it is well known to all that know anything of the disease, that it may be cured in the part or parts affected but it is sure to break out in another place, and as long as a scab the size of a shilling is to be found, it cannot be said that the animals are clean; in fact, unless they are washed all over with the mixture it is sure to break out again; but whenever a stock is so affected, they would