THE APTERYX, OR KIWI.

The apteryx, or kiwi, is a native of New Zealand, and is a very strange, weird bird. It has scarcely a trace of wings, and is on that account called apteryx, or wingless. It has very little similarity to other short winged birds. Its body is compact, its neck short but thick, the wings so stunted that they are scarcely visible, except in the skeleton. The plumage consists of long, lancet-shaped feathers, which are covered part of their length with shiny silken down. The quill portion of the feathers is very short. The general color of the apteryx is chestnut brown. The bird has no tail. The beak is long and curved; the nostrils, very small and narrow, are set on each side of the tip. The legs are very strong and short.

Not many years ago the apteryx was thought to be a fabulous bird, and its veritable existence was denied by scientific men. The first one brought to Europe was called the Apteryx australis; it was killed in the forests of New Zealand, on the southwestern coast. A second one from the same locality was carried to the British Museum.

Almost all the specimens found in collections now come from the North Island, and belong to another species (Apteryx mantelli). This bird is called kiwi by the natives. Bartlett says that this species is distinguished from the others by being somewhat smaller; it has also longer legs and shorter claws, and there are long bristly hairs on the head. The color of the plumage is darker and more reddish.

The kiwi lives in the uninhabited forest regions of the North Island, but is wholly extinct in the inhabited regions, and is not very easily captured. Dieffenbach, who resided in New Zealand eighteen months, only obtained one skin, although he offered large rewards to the natives.

The bird is found now most frequently in Little Barrier Island, a small uninhabited island covered with dense forests, situated in Hauraki Gulf, near Auckland, and in the forests of the mountain chain between Cape Pallisir and the East Cape, on the southeastern side of the North Island. This island consists of mountains about seven hundred meters high, is only accessible in a quiet sea, and the existence of these wingless birds there proves that it was once connected with the other part of the island. Two of these birds, male and female, were captured alive near the source of the Rocky and Slate Rivers, on a dangerous height a thousand meters above the sea. The natives carried them to Hochstetter, who paid five pounds sterling for them.

In the year 1861 Skeet found the kiwi very abundant upon the grassy mountain ridges on the eastern side of the Owen River. With the help of two dogs he caught every night from fifteen to twenty of these birds. He and his people subsisted upon their flesh.

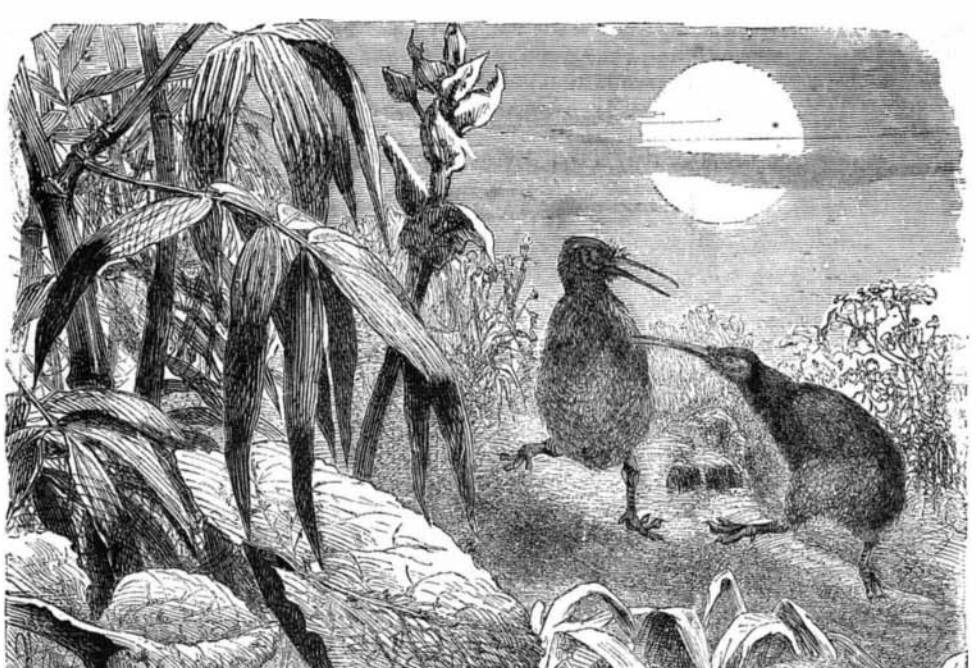
These birds are nocturnal, and during the day hide in holes in the earth or under the roots of large trees, and only come forth at night to obtain their food. They live upon insects, larvæ, worms, and the seeds of various plants. The natives hunt them only at night, and often bewilder them so with the glare of their torches that they can be caught by the hand or knocked down with sticks. They are remarkably fleet of foot, which makes up for the absence of wings. When running they take long strides, hold their body in an inclined position with the neck stretched out. They move cautiously, and as noiselessly as a rat. If disturbed during the day they yawn frequently, and wrench their wide open jaws out of shape in the most singular manner. If provoked they raise their body to an erect position, lift up the foot to the breast, and strike with it, their only but not insignificant weapon of defense. It has been said that they attract worms to the surface by striking on the ground with their powerful feet.

While in search of food they make a constant snuffling sound through the nostrils. It is doubtful whether they are guided by the sense of feeling or of smell. It is certain that the sense of feeling is strongly developed, for they touch every object with the point of their bill, whether they are eating or examining the ground. When they are confined in a room or cage, the snuffling sound is only perceptible during the night when they are in search of food or eating, and is not heard when they softly touch the walls of the cage. Buller has observed these imprisoned birds searching the ground in the immediate vicinity of a lost worm, without finding the morsel again, and has noticed that they are never able to take a piece of meat from the ground or from a vessel of water until they have touched it with the point of their bill.

It is very amusing to see the free birds searching for worms. They thrust their long bill in the soft ground, sinking it almost to the roots, and draw it forth immediately with a worm in the point of the bill. They never draw the worm from the ground suddenly, but are very careful not to mangle it. When they have laid the worm on the ground, they throw it into their jaws with a sudden motion, and then swallow it. They consume insects and berries in the same way, and take up small stones.

In the London Zoological Gardens the cage of this bird is in a dark stall; some straw is piled up in one corner. The Kiwi conceals itself behind this straw during the day. If the keeper takes it out from its hiding place it looks puzzled for a time, but when it is placed on the ground it turns its back and runs back to the straw in the most absurd style. After the sun goes down it runs about in a lively manner, and thrusts its long bill into every corner.

The female in the London gardens has laid several eggs.



THE APTERYX, OR KIWI.

The bird weighs a little more than four pounds, and the eggs, which are remarkably large, weigh between fourteen and fifteen ounces.

"The skin of these birds is very tough, yet flexible, and the chiefs in New Zealand set great value upon it for the manufacture of their state mantles, permitting no inferior person to wear them, and being extremely unwilling to part with them even for a valuable consideration."—*From Brehm's Animal Life.*

Peanut Flour.

The value of the peanut crop of this country for the current year is estimated by the Savannah *Telegram* at $3,000,000. That paper says that "the Virginians are beginning to turn the peanut into flour, and say it makes a peculiarly palatable 'biscuit.' In Georgia there is a custom, now growing old, of grinding or pounding the shelled peanuts and turning them into pastry, which has some resemblance, both in looks and taste, to that made of cocoanut, but the peanut pastry is more oily and richer, and, we think, healthier and better every way."

Lime Cartridges for Mining Coal.

According to the *American Manufacturer* (Pittsburg, Pa.), some experiments have been made with cartridges of condensed lime in mining coal at the Eureka mine at Houtzdale. The tests were successful in shattering the coal, but better results would have been reached if the coal had not been too soft. It appears that the lime charges must be compressed by hydraulic or similar means under a pressure of forty tons on a cylinder of two and a half inches, nearly doubling the density of the lime. Thus treated, and secured in a hole drilled in the coal, water is pumped to the cartridge, reaching its entire length, and the expansion effects an enlargement of five times the original bulk of the cartridge, necessarily shattering the surrounding walls of coal to that extent without an explosion.

Removing a Bluff by Hydraulic Power.

The Sioux City *Journal*, describing a test of hydraulic machinery to be used in washing away the threatening bluffs which hang over the track of the Milwaukee road two miles west of that place, says: From the Worthington pump, which is considered the more powerful of the two on the boat, an 8-inch pipe extends up the bank to a height of about 60 feet, where it reaches the road bed of the track. It then runs under the track nearly to the base of the bluff and terminates in a movable iron nozzle with a 2-inch end. From the point where the nozzle is directed toward the bluff begins a sluiceway constructed of boards and about 2 feet deep. This sluiceway leads under the track, downward in a diagonal course to the river.

The pipe through which the water rushes to the nozzle is well secured. The sluiceway is constructed on timbers, and is strongly braced. As the nozzle points toward the bluff, without the water rushing from its mouth and the sluiceway is dry, there is nothing particularly curious or interesting in the machinery's appearance; but when the big boiler at the water below begins to puff, the powerful pump commences action, and the glittering stream shoots from the mouth of the nozzle with lightning speed, and, hardly spraying, strikes the bluff with terrific force, boring deep into the earth and causing the dust to rise in clouds, some appreciation of the force of the water can be gained. Then too, the practical result of the aqueous battering ram's power is seen in the mass of mud which rushes through the sluice.

Hundreds of tons of earth made soluble melt away in an hour and are swiftly carried off through the apparently small board runway to the river below. When all was ready the signal was given, and the water began to rush through the pipe and pound away at the bank. In five minutes immense quantities of the dirt were melting and rushing through the sluice. The cutting was done in a scientific manner. First, the water was sent against the bluff sixty feet up, and holes bored to weaken its dry solidity. Then the boring began underneath, and the foundation of a mass of earth sixty feet high and ten feet thick by about fifty feet in width was dug away. All at once the big chunk gave way, and with vast clouds of dust and much noise fell downward and toward the track. The plucky pipe man and his assistants were the least disturbed by the slide and advance of the earth, but they had cause for alarm, as for an instant it looked as if a large portion of the bluff would be affected by that detached, and would break loose to sweep everything before it to the river.

During the hour, while the crowd of visitors remained, a much larger quantity of earth was washed away than was expected when the work commenced, and the officials generally seemed to be satisfied that at last an effective way of conquering the dangerous bluff had been found. It being understood that General Superintendent J. T. Clark was the proposer of the hydraulic method of cutting away the bluff, and that principally through his efforts it has been brought to a practical test, he was briefly interviewed. He expressed himself much pleased with the result of the experiment as far as it had gone. He added that it was only an experiment, but that it looked to him as being much more effective than blasting or shoveling, while the ultimate expense would not be half so great.

THE Ohio Powder Company is making 250 kegs of powder per day, and running the machinery day and night to keep up with its orders.

The Phenomena of Metalliferous Deposits.

BY PROF. JOSEPH LE CONTE.

The following is an abstract of a paper read before the American Academy of Sciences at its late meeting in Washington, which in the author's absence was read by Prof. T. Sterry Hunt:

The paper said that the phenomena of metalliferous deposit by solfatusic action at Sulphur Bank and Steamboat Springs have tended strongly to confirm what he had previously believed to be the most probable theory of vein formation, and at the same time to give it more clearness and definiteness. The structure, the mode of occurrence, and the contents of metalliferous veins leave no longer any room for doubt that they have been formed by deposit from solutions. If any doubt had lingered on this subject, it was thoroughly dissipated by the phenomena of deposit still in progress at Sulphur Bank and at Steamboat Springs. Among the metallic ores cinnabar has long been considered a possible exception to this mode of deposit. The extreme volatility of this sulphide, the extreme irregularity of its veins, and its frequent occurrence in the vicinity of comparatively recent volcanic action have suggested that it may have been deposited in irregular fissures, cracks, cavities, etc., by condensation of its vapors sublimed by volcanic heat beneath. But the phenomena of Sulphur Bank and Steamboat Springs ought to settle the question forever. Cinnabar as well as other metallic sulphides are now being deposited there, along with silica, from solution. Admitting, then, as established the view that metalliferous veins have been deposited from solutions, the most difficult questions still remain: What are the conditions under which deposit takes place? and, What, in addition to simple water, have been the solvents?

In answering the first question it must be remembered that the chemistry of nature is far more subtle and refined than that of the laboratory: that substances which are regarded as practically insoluble in the latter cannot be so regarded in the former. The infinite patience of nature and the infinite slowness of her operations must be taken into account. In the perpetual circulation of subterranean waters infinitesimal deposits, continued and accumulated through almost infinite time, produce large results. Thus mineral veins may be composed of substances of extremest insolubility, and yet be deposited from solutions. In fact, such extreme insolubility, or at least very feeble solubility, would seem to be a condition of mineral vein formation, for otherwise the minerals would be in most cases brought to the surface instead of being deposited below.

Again, it must be borne in mind that solubility, even the feeblest, is notably increased by heat, especially super-heat, and by pressure. The latter is generally regarded only as a necessary condition of super-heat and not as itself an active agent. But in fact pressure acts directly as an active agent in increasing the solubility of nearly all substances. Mr. Sorby has not only proved this by actual experiment on a great variety of substances, but has shown that it is a necessary consequence and beautiful illustration of the law of correlation and conservation of natural forces, and that we have in this as in the case of fusibility an example of the equivalency of mechanism and molecular forces. For, as in the matter of fusibility in all cases in which expansion takes place in fusion, pressure by resisting expansion raises the fusing point, while only in those exceptional cases like ice, in which contraction takes place in fusion, pressure by arresting contraction lowers the fusing point. So also in the matter of solubility, in all cases in which contraction takes place in solution, namely, in which the volume of the solution is less than the combined volumes of constituents, pressure by arresting contraction increases solubility, while only in very exceptional cases as, for example, sal ammoniac, in which expansion takes place in solution, pressure by resisting expansion diminishes solubility. These latter cases are so extremely rare that we may assume as a law the increased solvent power of water in proportion to pressure. It is even possible by experiment thus to determine the mechanical equivalent of the chemical force of solution of any given substance; and, in fact, this has been so determined for several substances by Mr. Sorby.

There can be no doubt, then, that the solvent power of water may be increased without limit by corresponding increase of heat and pressure. It is quite certain, therefore, that water deep in the interior of the earth, especially in volcanic regions, and therefore under heavy pressure and super-heat, would have its solvent power greatly increased, not only by the super-heat, but also by the pressure. It is believed that few substances could resist entirely its solvent power. Such waters, coming up slowly toward the surface through fissures, large and small, would have their solvent power diminished both by cooling and by relief of pressure, and must of necessity deposit in their courses and form mineral veins. But the solvent power of subterranean waters is still further very greatly increased for most vein matters by the pressure of alkali in the form of alkaline carbonates or alkaline sulphides, or both. This is especially true of the commonest of vein stuffs, viz., quartz and lime carbonate, and the commonest forms of metallic ore, viz., metallic sulphides. The solubility of silica in alkaline carbonated waters is well known, and with excess of carbonic acid in the waters all the earthy and metallic carbonates are also soluble. The solubility of many and probably of all metallic sulphides in alkaline sulphides, especially with excess of hydrogen sulphide under pressure and super-heat, can no longer be doubted; for iron sulphide and mercuric sulphide are now being deposited from such waters, both at Sulphur Bank and at Steamboat Springs.

Mr. Christy and others have proved the solubility of mercuric sulphide under pressure and super-heat by actual experiment; and these are among the most insoluble of metallic sulphides. It is certain, then, that metallic sulphides are soluble to a limited extent in alkaline sulphides, forming doubtless double sulphides. It is certain, also, that the solubility is increased by super-heat and pressure. It is therefore also certain that hot waters containing alkaline carbonates and alkaline sulphides, circulating at great depth and therefore under heavy pressure, would take up silica, earthy and metallic carbonates, and metallic sulphides, and that coming up slowly toward the surface they would deposit these substances in their courses, partly by cooling and partly by relief of pressure, and thus form metalliferous veins. Cooling and relief of pressure are the most useful causes of deposit, but not the only ones. Organic matters are of almost universal occurrence in subterranean waters, and their agency in reducing metallic oxides and metallic salts is well known. Organic matter is a universal reducing agent.

The acids of organic decomposition may prove a reducing agent. Such in brief is an outline of a true theory of the genesis of metalliferous veins—a theory apparently confirmed by the study of causes now in operation at Sulphur Bank and Steamboat Springs, and probably many other places in California and Nevada.

Sea Bathing.

At the present time, says the *British Medical Journal*, it may be useful to recall the chief general indications and contra-indications which respectively sanction and forbid bathing in the sea. "Shall I bathe?" This is a question which thousands of health seekers will be asking of their doctors during the next few weeks. While the stimulus of a fresher air, of change of scene, and of new occupations, together with rest from accustomed work, are the elements from which the weakly, the worn, the worried reap physical and mental restoration in a sojourn on the sea coast, it is unquestionable that bathing in the open sea is, in itself, a powerful restorative agency, which many persons may employ with very great advantage.

The universal experience of our race, through unnumbered ages, has shown the value of sea bathing in both preventive and curative medicine. A good rule, laid down by an experienced physician, is this: In all cases showing impaired functional powers, without any manifestation of inflammatory symptoms, in short, in those cases in which the exhibition of alteratives and tonics is indicated, sea bathing may, with proper precautions, be resorted to: it is contra-indicated in persons of plethoric habit of body, in cerebral congestion, in organic disease of the heart, in aneurism, and in all persons who have the inability safely to encounter a comparatively severe shock; while it is also to be forbidden at certain periods in which the female constitution is not prepared for the application of powerful remedies. Because it tends, in certain conditions of impaired health, to cause determination of blood to the viscera. Bathing in the open sea is generally unsuitable for persons disposed to congestive disorders of the lungs, kidneys, liver, and brain. Albuminuria, advanced anæmia, and a liability to hæmoptysis are also conditions which are usually accepted as contra-indicating sea bathing.

It is hurtful to bathe babies in the sea; children under two years of age are too young to bear with advantage the comparatively severe shock of a cold sea bath. In old age, when the bodily powers are unequal to a vigorous reaction, sea bathing may do much harm, especially in the subjects of extreme arterial degeneration. In suitable cases, and under proper precautions as to time of bathing and duration of exposure, a daily bath in the open sea is a valuable restorative. In individuals who are fairly robust, it is a stimulant, alterative, and tonic, promoting appetite, tissue change, and excretions, and bracing up the nervous, vascular, and muscular systems. Sea bathing is especially useful as a powerful and unsurpassed tonic in delayed convalescence from acute diseases, in many chronic affections, and in persons whose strength has become enfeebled by injurious excesses, by mental strain, or by unhealthy occupations.

The Aeration of Yeast.

Some interesting experiments on fermentation have been made by D. Cochin, and his results are given in a recent number of the *Comptes Rendus* of the French Academy of Sciences. Other investigators have proved that the membrane surrounding yeast cells is penetrated by glucose solution, and fermentation does not commence until some time after this endosmose has taken place, and this has been fully confirmed by Cochin. His experiments on aeration of yeast are most interesting, and the conclusions founded on them are in some respects striking. He found that if yeast be suspended in water and aerated by repeatedly decanting the liquid from one vessel to another, the aerated yeast, when added to a solution of glucose, exerts simply a diluting effect equal to that which would be produced by the same volume of water; if, however, the yeast be deprived of air by suspending it in recently-boiled water, and covering the water with a somewhat thick layer of oil, and heating the liquid to 20° C. for periods varying from two hours to several days, the effect produced on a solution of glucose is different. After eight days' heating the yeast is still permeable to the sugar solution, but fermentation scarcely commences; the yeast has been asphyxiated. After two hours' heating, the absorption of sugar begins, but it is only after twenty-four hours' heating that the phenomena are most distinctly observed; at the end of this period, when the yeast, thus deprived of air, is added to a solution of glucose, the latter is absorbed by the yeast cells to such an extent before fermentation commences that the amount in solution is diminished one-half.

If a quantity of the liquid is boiled, mixed with an equal volume of alcohol, and filtered, almost the whole of the sugar is found in the filtrate, only a small proportion having been converted into alcohol, thus proving that very slight fermentation takes place under these conditions. From these experiments it is evident that the transformation of sugar takes place in the interior of the cells, and that deprivation of air brings the cells into the condition most favorable for absorbing the sugar. Cochin also observed that aerated yeast and yeast deprived of air, also show great difference in their fermentative power. The former produces an amount of alcohol much below the normal amount, and decomposes part of the sugar without converting it into alcohol. The practical lesson to be learnt from these investigations is, that a wort prior to pitching, and the pitching yeast itself, ought always to be deprived of air as much as possible, but as soon as the sugar has had time to penetrate the membranes of the yeast cells by endosmose, a thorough aeration of the wort ought to be effected, so as to set up and maintain an active fermentation.

The Power of Water.

The properties of water are only partially understood by those who have never seen it under high pressure. The Virginia City Water Company get their supply from Marlette Lake on the Tahoe side of the mountain. They get it through by a long tunnel, and are then on the crest of a high mountain opposite Mount Davidson, with Washoe Valley between. To cross this valley by a flume would be almost impossible, so the water is carried down the mountain side to the bottom, and crosses under the V. & T. Railroad track, on the divide between Washoe and Eagle valleys, then up again to the required height in iron pipes. The depression created in the line of carriage is 1,720 feet, and the pressure on the pipes is 800 pounds to the square inch. One pipe is 11 inches in diameter, and is quarter-inch iron lap welded, and 18 feet long, with screw joints. There is little trouble from it, but the other, which is twelve inches in diameter, and is riveted pipe, makes more or less trouble all the time. The pipe is laid with the seam down, and whenever a crack is made by the frost or sun warping it, or from any other cause, the stream pours forth with tremendous force. If the joint is broken open, of course the whole stream is loose and goes tearing down the mountain, but usually the escape is very small. The break last week was less than five-eighths of an inch in diameter, and yet the water in the flume was lowered an inch and a half by it, and the pressure went down fifteen or twenty pounds. Captain Overton says that fifty inches of water went through it. It has been probably a year in cutting out, and was made by a little stream hardly visible to the naked eye, that escaped through a joint and struck the pipe two or three feet off, eating away the iron until the pressure inside broke it through. When such a break occurs the noise can be heard for half a mile, and the earth shakes for hundreds of feet around. A break the size of a knitting needle will cut a hole in the pipe in half an hour. Such breaks are repaired by putting a band around the pipe, pouring in melted lead, and tamping it in. Such a stream bores through rock like a sand blast. The flying water is as hard as iron, and feels rough like a file to the touch. It is impossible to turn it with the hand, as it tears the flesh off the bones, and if the fingers are stuck into the stream, with the point up, the nails are instantly turned back, and sometimes torn loose from the flesh.—*Reno Gazette.*

Sewer Gas and Typhoid Fever.

Dr. George Hamilton, in the *Medical Record*, takes issue with those who assume the conveyance of germs of typhoid and scarlet fevers, diphtheria, and dysentery by contaminated drinking water, and who do not believe that sewer gas can spread the infection or originate the diseases. Referring to the epidemics that sometimes occur suddenly in cities fed with drinking water from some common source, he says that their sudden appearance and as sudden disappearance cannot be attributed to the character of the water, except on the supposition that the water changes suddenly from purity to impurity, and *vice versa*, a supposition incompatible with the delivery supply of water from reservoirs. Walled-up cesspools, he says, are common in the city and not usually found in the country, and the exhalations from unventilated and uncared for vaults have much to do with the prevalence of typhoid diseases.

An Aid to Russian Literature.

From Nicolas Schischkoff, a member of the Imperial Russian Technological Society, St. Petersburg, Russia, we have received a copy of a monthly publication in the Russian language that attempts to give its readers "a guide through the mazes of contemporary technical literature," by copious extracts from technical publications from all parts of the world, and by an alphabetical reference index. Such a monthly is well calculated to be of use to Russians who desire an acquaintance with the sciences as practically applied by the western nations of Europe.

Effect of Condiments, such as Salt and Pepper.

The following contribution to the *Bulletin* of the French Hygienic Society by Dr. G. Husson has been deemed worthy of translation, from its practical bearing on our daily life:

When we cast a retrospective glance at the culinary art among all people, extending back to the most remote antiquity, we are surprised at the importance that seasoning and condiments have never ceased to have.

This peculiarity possesses sufficient interest to induce us, at another time, to study into the origin, causes, and effects of their use. At present we will merely examine into their influence on digestion, and will report on salt and vinegar alone.

Condiments, in fact, are not only intended to make the food more agreeable, to excite the appetite, to flatter the palate, and to create enjoyment, but they also have an effect on the phenomenon of digestion. Science has recognized the fact, and man has always instinctively felt this influence of condiments upon the digestive functions; but then he frequently only thinks about satisfying his taste. It is the necessity of his being that he obeys. The care bestowed on the preparation of food has existed everywhere and at all times, originated in these impulses, and they are next to medicine and chemistry in calling attention to the necessity of giving attention to the preparation and seasoning of food, even of the simplest kind. Still we would not insist on this subject if it were not for combating an unfortunately very common custom.

It too frequently happens that because a dish is modest the preparation is neglected, and people think to supply what is lacking by heavy doses of salt and pepper. Here two serious errors are committed, for it is with our food as with our dwellings: the more simple they are, the more care they should receive.

The use of salt and of acids in excess may prove injurious, as we shall attempt to prove by certain experiments that we have made. These experiments were made on pieces of meat deprived of fat and gristle, either dressed with all sorts of condiments, with wine, with vinegar, with oil, or simple dishes with some salt but no liquid.

After the pieces of meat had been macerated or in contact with the condiments for four days, four grammes were taken from each sample and put in a phial with one gramme of liquid pepsine and 40 grammes of water containing 0·1 per cent of hydrochloric acid.

For comparison two other phials were taken, and in one was placed 4 grammes of meat that had not been subjected to any culinary preparation, with a gramme of pepsine and 40 grammes of acidulated water as before. In the other phial were placed the same substances and in the same quantities, except that the acid was 1 to 40. They were all put in a water bath and kept at a temperature of 40° C. (104° Fahr.).

The results were as follows:

The meat in wine was very rapidly digested, and that in vinegar followed next. The meat in oil and that *au charbon* fell in the third line; they required nearly as long a time for digestion as the meat that had had no culinary preparation; salt meat and raw meat that had been in the stronger acid were very difficult of digestion.

With papaine, a substitute for pepsine, the results were still neater, but were in harmony with the preceding.

These experiments also showed me at the same time how little reliance can be put on commercial pepsine.

Other experiments lead to certain remarkable conclusions regarding salt and acetic acid, as follows:

If four grammes of hashed meat be placed in a phial with four grammes of water, one of liquid pepsine or papaine, and four drops of hydrochloric acid, and the following quantity of salt added, namely, 0·05, 0·1, 0·25, 0·5, 1, 2·5, and 5 grammes, it will be found that salt in small doses slightly facilitates the action of peptic ferment; but when it reaches 0·5 gramme it retards digestion; and in proportion to the quantity present.

When glacial acetic acid was used instead of salt, in quantities of 4, 2, 1, 0·5, 0·25, and 0·10 gramme, the meat dissolved more rapidly the greater the quantity of acid there was. With papaine and four grammes of acetic acid the transformation was almost instantaneous. But although an excess of acetic acid dissolves the meat more rapidly, it is necessary to add that besides the peptones, there is also a substance formed from gelatine which is precipitated by sulphate of magnesia, and the quantity is directly proportional to the amount of acid.

If we take one gramme of monohydrated acetic acid and one of meat, and filter it after digesting and neutralizing, a precipitate will be produced with sulphate of magnesia, but it is scarcely perceptible. So that we may accept from 1 to 1½ per cent of acid, or from 10 to 15 per cent of vinegar, as the proportions favorable to good and rapid digestion.

From the preceding facts we may draw the following practical conclusions:

A. Certain condiments seem to have no other use beyond exciting the secretion of the various juices necessary for digestion.

From one point of view salt, in small quantities, may be placed in this class, if when it enters the system it is not transformed into hydrochloric acid, one of the constituents of the gastric juice. The amount of salt employed in cooking ought not to exceed 1 or 2 per cent or 1 ounce to 6 or 12 lb. of meat. If more than that is employed, it will do one of two things: 1. It will modify the structure of a portion of the muscular fiber of the meat salted, so as to make it resist more strongly the action of gastric juice; 2. In the stomach itself it retards and checks peptic fermentation.

Hence, salted and smoked meats are more indigestible than other meat.

Salt in excess is also an irritant.

B. Non-poisonous organic acids aid digestion. Hence the use of vinegar as a condiment is based on good reasons, but with the condition that the quantity must not be so great as to irritate the stomach itself.

C. Although the mineral acids, hydrochloric in particular, in the proportion of 1 to 250, are essential for digestion, in large quantity they have the opposite effect, and may even arrest it.

This inconvenience and the danger of setting up an inflammation in the mucous membranes show the necessity of employing vinegar entirely free from hydrochloric or sulphuric acid.

Such is the *resume* of my observations relative to this part of the question.

G. HUSSON.

Device for Discharging Water from Vessels.

Last week a successful practical trial was made in this harbor of Keating's improved device for discharging water from ships without pumping. The invention consists of a valved tube which passes through the hull of the vessel, at or about midships. The tube is arranged to be pushed down outside of the hull when in use, and withdrawn even with hull when not in use. The tube carries a valve, by opening which communication between the inside of the hull and the water outside may be established. The extremity of the tube, looking toward the stern of the vessel, has an orifice, but the front portion of the tube is solid. When the tube is pushed down through the ship's bottom, the forward motion of the vessel will produce a suction in the tube, and if the valve is opened the water in the hull will be drawn out.

The inventor expects that sailing and steam vessels may be kept dry and prevented from sinking by simply adjusting the tube and valve as above indicated. On the recent trial here the valve was applied to an old scow sixty feet long, towed by a tug. The valve was opened and water was allowed to flow in and fill the scow until it was almost ready to sink; the tug was then started, and under a speed of three miles an hour the scow was in ten minutes relieved of its water in the manner described. A similar trial was lately made at Buffalo, N. Y., with equal success. The invention has realized in practice all that the inventor claims, as far as it has been tried. How it will work on deep draught vessels, where the water pressure against the bottom of the hull is increased, has yet to be shown. The Keating Company, No. 86 Duane Street, New York, is now ready to furnish and attach this novel appliance to vessels of all descriptions.

Steaming and Bending Wood.

In an address recently delivered by Mr. H. G. Shepard, of New Haven, Conn., relative to the use of wood in carriage making, he said that after a piece of wood is bent its characteristics undergo a considerable change. The wood is heavier, and its fibers have become interlaced; it will sustain more pressure and strain than straight wood in the same directions, either across or with the grain. He said: A piece of timber that has been steamed, whether it is bent or not, has its stiffness increased. It is more brittle than it was before, and for some uses it will do as well, and yet there is a quality that the steaming process and the kiln drying process affect very much the same; they both cook the gum in the timber and make it brittle and stiff. There is a grade or class of hickory that is benefited by being steamed or kiln dried for use as spokes or whiffletrees. There is a kind of hickory that never becomes stiff by a natural process of drying, and one of the desirable qualities of a spoke, rim, or whiffletree, is stiffness as well as strength; you take that hickory—and it is the very best we have—and steam it, and it is better fitted for these purposes than it was before. It is difficult to tear apart a piece of bent wood; the fibers are interwoven, one with the other. We do not perceive the change on the outside, but when we come to split the stick open we find that its character is entirely changed.

A Singular Tombstone.

Doctor Prime, the venerable editor of the New York *Observer*, usually spends the summer months traveling in his native State, and about New England, and wherever he stops he is a welcome visitor. His weekly letters in the *Observer* are widely read, and are enjoyed by everybody.

In his travels, Irenæus comes across some quaint people, and many queer things which he keenly appreciates, and he gives an account of them in his interesting letters.

Among his last discoveries, Dr. Prime has found an odd monument in northern New York, which had been erected to the memory of a most excellent woman. A good man had lived happily with a devoted wife until they were well on in years, when she died. He bethought him of some fitting memorial to place over her grave, and the happy thought struck him that the square stove, by which they had been comfortable through many long winters, would be just what she would like to have if she had a voice in the matter. He had the stove taken to the churchyard and placed over the remains of his companion, who sleeps quietly underneath it.

Brooklyn Bridge Traction Cable.

Splicing the endless cable that is to be used in propelling cars over the New York and Brooklyn Suspension Bridge was a work requiring unusual skill, as it was an unusual task. The rope is a compound of a hemp core or center and an envelope of steel wire. It is 11,600 feet long, or about two miles. Its weight is 3·1 pounds per foot, which gives it 35,900 pounds for a total weight. The diameter is 1½ inches, and it has a breaking strength of 50 net tons. The splice is 160 feet long. It would be useless to our readers to attempt a description of the method of splicing, which, however, is similar to that of hemp or Manila rope splicing so far as that is applicable to this composition cable. The skill particularly required in this work is the union of the steel wire envelope. And this work is so exactly completed that to designate the splice from the other portions of the cable it has been painted white. It is probably the longest rope splice ever made.

Rights of the Bull in England.

A recent decision by Lord Coleridge, C.J., in the Queen's Bench Division, as quoted by the *New Jersey Law Journal*, sounds singular here, where statutes and municipal regulations so generally prohibit estrays, and hold their owners liable. Unfenced highways are increasing under the protection of these laws, and in some New England cities and villages there are long stretches of front yards and lawns without any defensive protection from the traveled street or roadway. The judge in this case ruled that the owner of an ox, which had entered the plaintiff's open shop door while being driven through the street, could not be held liable for damage done. He said: "We find it established as an exception upon the general law of trespass, that where cattle trespass upon unfenced land immediately adjoining a highway, the owner of the land must bear the loss (quoting authorities). I could not, therefore, if I would, question the law laid down by such eminent authorities, but I quite concur in their views, and I see no distinction for this purpose between a field in the country and a street in a market town. The accident to the plaintiff was one of the necessary and inevitable risks which arise from driving cattle in the streets in or out of town."

The Curl Fungus on Peach Trees.

The New York Agricultural Experiment Station gives this, among other items, in its bulletin of July 28:

Dr. B. D. Halsted, of New York city, who is especially skilled in that branch of science which includes the injurious fungi, has forwarded us a letter from which we quote:

"May I add to the information on *the peach curl* given in the bulletin for June 16? This injurious deformity of the peach leaves has been ascribed to plant lice and other insects, but is now known to be caused by a minute fungus known to science as *Taphrina deformans*. This minute parasitic plant makes its appearance in early spring, and causes the foliage, as stated in your bulletin, to twist and curl out of natural shape. The fungus is not distantly related to or causing the black knot of the plum and cherry trees, and the same remedy is the only one used, as far as I know. Remove all the affected parts so soon as they appear, and burn them. It is best to cut off the young twigs bearing the 'curled' leaves, and this can be done quite rapidly. Be sure and burn all parts removed, to prevent the ripening of spores in the infested leaves."

Maple Last Blocks.

The Bangor, Me., *Mining and Industrial Journal* has the following: Last blocks are an important article of manufacture in the towns of eastern and northern Maine. Blanchard, Lagrange, Alton, and Katahdin Iron Works will each ship about 25 car loads this season over the Bangor and Piscataquis Railroad. Large numbers are also cut on the line of the Eastern & North American division of the Maine Central, and also in the towns to the eastward of Bangor. The blocks are cut from rock maple, and the work of getting them out gives quite remunerative employment to the farmers and their sons during the long winter months. A million and a half of these blocks, valued at about $36,000, were shipped from Bangor last year, principally to western Maine, New Hampshire, and Massachusetts shoe towns. This, however, by no means includes all the last block business of this section, as large quantities are shipped each season by way of Calais.

Products of the Slow Combustion of Ether.

When the vapors of ether mixed with air pass over a strip of glowing platinum, it continues to glow and the slow oxidation produces a mixture of formic and acetic acids with aldehyde, acetal, and methyl aldehyde. Legler has investigated this product (*Ann. Chem.*), and succeeded in isolating another new substance. From the slow oxidation of 150 or of 200 c. c. ether he obtained 25 or 30 c. c. (1 ounce) of a clear liquid with a sour smell resembling aldehyde. Upon cooling this in a desiccator the new substance crystallized out rhombic prisms.

It contains 26·44 per cent of carbon to 6·42 of hydrogen which points to the empirical formula $C_{11}H_{33}O_{21}$. It is a peculiar fact worthy of note, that when treated with ammonia and then acidified it exhibits the same reaction exactly as peroxide of hydrogen. Legler is engaged in investigating the constitution of this new substance.