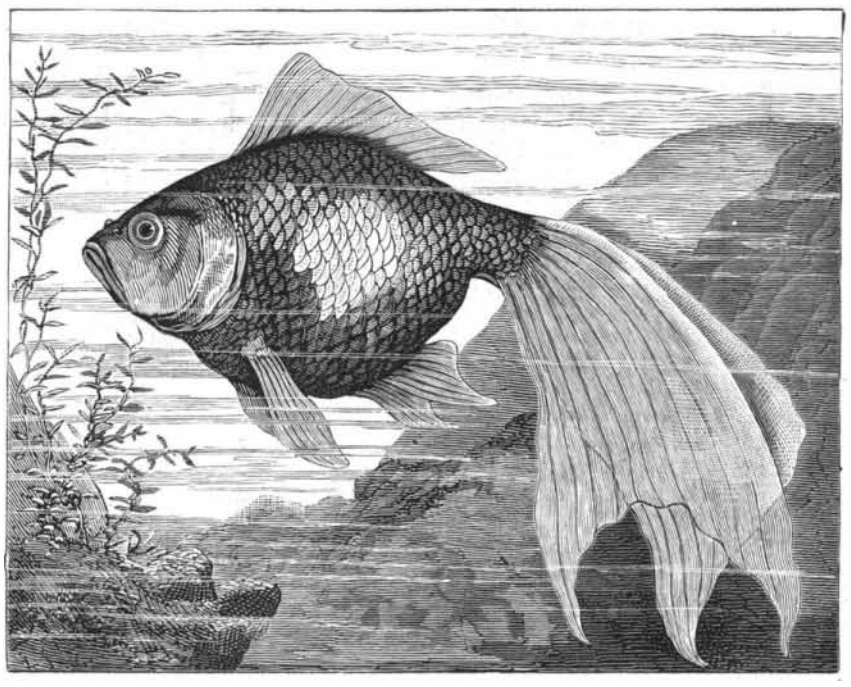
THE KINGIO AND THE TONG-TSING-YO.

The kingio, one of the most beautiful varieties of the golden carp probably ever bred, was imported from Japan by Mr. Gill, of Baltimore, a few years ago. After much persuasion and an offer of $500, one of the most beautiful of the few that reached this country alive was secured for the aquarium.

Too much can hardly be said of the wonderful beauty and grace of this fish. Its sides were resplendent with delicate pearly and golden tints, which, as it moved through the water with great dignity, are constantly changed in degrees of color under the various angles of light. It is said that this single specimen yielded to the establishment not less than $3,000 profit. Had it been fed on vegetable food instead of animal (raw liver) it might still be alive. The caudal and anal fins of this fish were united, and were of a pearly white color and of a delicate texture, which, as the kingio passed through the water, floated gracefully behind the fish as if composed of some delicate fabric. Several attempts have been made to establish this variety in this country, but all the specimens I have seen thus far seem to have gone back to the original starting point, which undoubtedly is the golden carp or our common gold fish.

The tong-tsing-yo, or telescopic-eyed fish (also known as the dragon-eyed fish), is a native of China. A few specimens of it were imported to this country a few years ago. This, like the kingio, is undoubtedly another monstrosity of the golden carp, and a very remarkable one, which has been established by continuous selection by the Chinese with the wonderful art they display in breeding these domesticated pets, until the progeny is so disguised that the original form is almost lost. Viewed from the front this fish has a large, broad forehead and great projecting eyes. With this fish the caudal and anal are united, but spread out from the fish, as shown in the illustration.



THE KINGIO.

The Durability of Gutta Percha.

In his lectures before the Society of Arts on the recent advances in telegraphy, Mr. W. H. Preece, the electrician to the British Post Office Department, pointed out some of the curious accidents to which gutta percha covered wires were liable: "Gutta-percha covered wires," he said, "would be very well if they would last. But, unfortunately, gutta percha is a gum that only appears to last when in water. In water it apparently is indestructible. Cables that were laid in 1851, and have been brought up within a recent date, are now as good as the day when first put down. But when gutta percha becomes exposed to the air, to the alternations of climate, especially when exposed to the action of the sun, it decays very rapidly; it oxidizes, and becomes a kind of resin that can easily be crumbled into a snuff-like substance. Many attempts have been made to protect it and to arrest this rapid decay. It has been surrounded by tape soaked with tar. Tar itself has been found to be injurious, and has been supplanted by other materials, but at the present moment we have not yet succeeded in finding anything that renders gutta-percha indestructible. In fact, when exposed to air, as when suspended in tunnels, it seems to have a life of about ten years; when laid down in our iron pipes, under the influence of the variations of temperature and moisture that exist there, it seems to last about twenty years; but in the sea, where it is exposed to equable temperature and equal condition, it apparently seems capable of lasting forever. There are many curious accidents and causes of interruption to working that we meet with in our gutta-percha covered wires, and one of the strangest is one of the last that we have discovered. We have found in many places that this gutta-percha is apparently gradually eaten away. It seems to go not unlike the way in which open air wires rust away; and this curious action only occurs in certain places. In certain parts of the country, North Wales, Dublin, Kent, and in one part and another, we have found this curious action going on; and careful examination and inspection under the microscope have led us unmistakably to conclude that it is due to something or other eating away the gutta percha. Curiously enough, wherever we have detected this action taking place, there, also, we have found swarms of a very minute insect, a very little thing, belonging to what is called the spring-tail tribe. It is a little white fellow that you can scarcely see, and when you do see him he seems conscious of the fact, for he immediately disappears with a spring. It is the *Templetonia crystallina*. It abounds in swarms in certain soils, and seems to have a great liking for gutta percha. It does not remain near the wire when it has eaten its way through, but, apparently, immediately retires when it touches the wire, as though it had received a shock, and makes a sudden retreat. It is a curious fact, and until recently it was unknown, that any living creature had a taste for gutta percha."

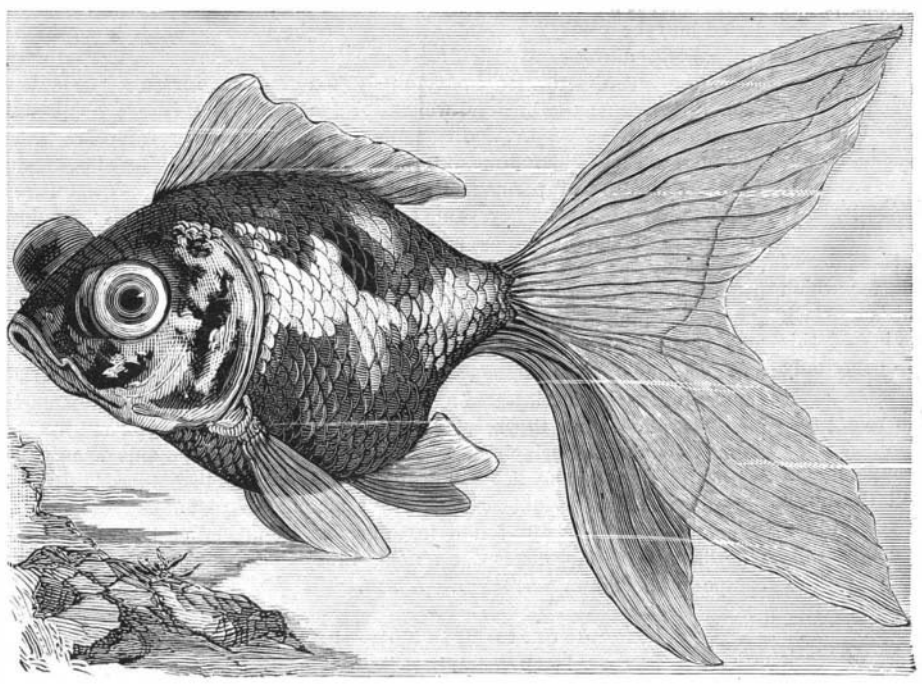
An Alligator Survives Freezing.

The ability of many of the lower forms of animal life to survive freezing is well known. Even those so high in the scale as fish—cat-fish, for example—may be frozen stiff and kept for days in that state, yet "come to life" when slowly thawed. The first instance of the revival, after freezing, of an animal as high in the scale as an alligator is reported in this city. During a recent coldsnap the window of a room, in which was kept a Florida alligator, was left open, and the water in which the reptile lay was frozen. The owner of the animal, a young physician, found his pet "as stiff as a poker," and to all appearances dead. It was placed in warm water, rubbed with alcohol, then wrapped in a cloth and left by a stove to warm up. After an hour or two it was rubbed again and dosed with liquor, its mouth having been pried open. This vigorous treatment was kept up for a couple of hours, when signs of life appeared, and in a few hours more the alligator had entirely recovered.

Foreign Bodies in the Ear.

At a recent meeting of the New York Clinical Society, Dr. G. H. Fox mentioned the case of a patient who for several days had had pain in the ear, with impaired hearing. A wad of soft paper was found firmly impacted in the ear, and was removed. The man had taken a surf bath a few days before, and had first felt the pain and deafness immediately after having been struck on the side of the head by a wave. The only way that he could account for the presence of the paper in his ear was that it had been carried in by the wave.

Dr. A. A. Smith alluded to the case of a lady who had engaged him to attend her in labor, and who complained of headache, dizziness, and nausea, without any evidence of kidney trouble. She soon found that she was somewhat deaf, and Dr. Smith discovered and removed from her ear a wad of cotton half an inch long, which had been inserted five months before. Her symptoms at once disappeared.



TONG-TSING-YO.

Terrapin.

In a letter to the *Republic*, of Washington, "G. H. B." tells what he knows about terrapin. The following facts are of general interest:

It is in Lent that terrapin commands its highest prices. They are worth from $25 to $36 a dozen during the season. A dozen terrapins consist of twelve diamond-backs, no one of which must be less than a "count terrapin," that is, measure seven inches in length on the under shell. The largest known do not exceed ten inches in length and eight pounds in weight, and such prizes are extremely rare. The seven inch terrapin averages four pounds in weight. "Sliders," the common river turtles of almost all the rivers of the South, grow to a much larger size. They bring from $6 to $9 a dozen.

The two or three men who control the trade in Baltimore say that they sell almost exclusively for private tables. Terrapin are caught all the way from Savannah and Charleston to the Patapsco and Gunpowder rivers—scarce here—but the genuine diamond-back belongs almost exclusively to the upper Chesapeake and its tributaries. The majority of the sliders come to Baltimore from the James river and streams adjoining. An active terrapin catcher sometimes makes $50 a week, but the find varies, and often runs down as low as $5. The reptile is discovered by probing the mud in the shallows with a stick. He is dormant and easily captured.

The females are more highly prized, and are known as "cow" terrapin. They generally contain about thirty eggs, some of which you have a right to expect to garnish the dish at $1.25 a plate. I am not betraying confidence in stating that may restaurateurs, reckless of their fair fame, have resort to the eggs of the pigeon made into a paste and rolled into a substitute for the genuine article. Thirty years ago the largest dealer in Baltimore found it difficult to dispose of the terrapin he received at $6 a dozen. The product, he says, is about the same year in and year out. He sells as many now as he did then. The negroes who bring them to market say that they are growing yearly scarcer, and nothing but the high price stimulates them to keep up the supply by a more extended and persistent search. The Commissioners of Fisheries of this State, in their report of 1876, deplore "the much diminished and rapidly diminishing supply of this most excellent luxury of the Chesapeake Bay," and suggest its increase by cultivation. They add: "There are hundreds of localities admirably situated in our terrapin-producing regions which could be made more productive, acre for acre, than the best surrounding land, by the establishment of terrapin ponds."

Importance of Fish Culture.

As the *American Ship* pertinently remarks, Hon. Levi P. Morton has done a good service in calling attention anew to the importance of farming our streams, lakes, and ponds, as well as the sea, that the water as well as the land be made to contribute to the food supply of our constantly increasing population. Norway leads the world in her fisheries, with an annual production valued at $13,600,000, and yet we have opportunities for expanding to a limit even surpassing these enormous figures. The artificial propagation of fish has been attended with encouraging results, first in Germany, then in France, and latterly in the United States, having become one of our most important industries. The United States Fish Commissioners say: "Norway is the only European nation that has a scientific commission occupied officially in the supervision of the fisheries and in devising methods by which they may be carried on and extended with the least possible waste. To the labors and observation of such men as Dr. Boeck, Professor Sars, and others, is due much of the present efficiency of the Norwegian fisheries." In 1867 we imported about as much fish as we exported. If we devoted sufficient energy to the business we could export one hundred times as much, and need import none at all. Fish culture is in its infancy. Its resources are immeasurable. It may approximate and even rival agriculture in importance. Its development will give employment to large numbers of men and bring food within the means of the poor as well as of the rich. The propriety and utility of international exhibitions, like that now in contemplation at Berlin, where the representatives of our nation can learn the nature of the products of the others, as well as show its own in a universal market, can no longer be questioned.

CEMENT FOR REPAIRING GLASS.—Dissolve fine glue in strong acetic acid to form a thin paste.

Colors and Dyes Used in Antiquity.

BY MARIUS MOYRET.

In the realms of literature and the fine arts the perfection of the ancients is willingly admitted. But in industrial matters they are either depreciated to an exaggerated extent or exalted beyond measure. We will endeavor to prove that both these opinions are at fault, at least in so far as colors are concerned, building simply upon positive facts, and strictly rejecting all hypothesis or random conjecture.

We will examine in succession the various colors known to the ancients, and compare them with our modern colors.

Whites.

Chalk and white lead were the only white colors known of old. But under the name of chalk they confounded true chalk (carbonate of lime) with various argillaceous earths, such as pipe clay. As for the white lead of the ancients, it is known only from the accounts of its preparation given us by Theophrastus and Dioscorides. According to Pliny, the white lead manufactured at Rhodes was superior to all others.

Davy, who has analyzed a great number of ancient colors, did not find white lead in any of the specimens submitted to his examination.

To the whites known by the ancients there have been added in modern times:

1. Pearl white, or subnitrate of bismuth, the use of which is of very little importance (being rarely employed save for the reprehensible purpose of powdering the face, a custom which is unfortunately no longer confined to women of questionable character).

2. Zinc white, a color preferable to white lead in a great number of cases, in so far as it is less poisonous and is not affected by sulphur fumes

3. Permanent white or *blanc fixe* (artificial sulphate of baryta). This color is absolutely fast, not poisonous (being neither volatile nor soluble under any probable circumstances), and very much cheaper than white lead. It is largely consumed in the production of paper hangings.

Dyeing white was unknown in antiquity. The natural whiteness of linen after being bleached on the grass—that of the wool of white sheep, after the action of burnt sulphur, which appears to have been known and practiced in very remote ages—and the white silks of China, were all that could be produced in the way of white goods.

To many persons, even in our days, the word "dye," as applied to whites, seems nonsense. Pure white does not exist.

Both vegetable fibers after being bleached with chlorine, and animal fibers after stoving, retain a yellow or grayish cast, which has to be combated by the addition of a color *complementary* to yellow. This is the meaning of dyeing whites, an operation which must be pronounced modern. Sometimes we go further than merely destroying the yellow tint, and give a slight color. White, therefore, now ranks truly among the very light shades, and takes various names according to its tint. Thus we have azure whites, inclining to a blue; cream whites, tending to a yellow, etc.

For a long time indigo and annatto have been exclusively used in white dyeing; then came extract of indigo and ammoniacal cochineal, which have in their turn been laid aside in favor of the aniline colors.

Blacks.

The ancients knew the several varieties of carbon still employed as black colors. The painter Apelles, according to Pliny, made use of the black obtained by the calcination of ivory.

Davy detected lampblack mixed with ochers in the pictures of the baths of Livia.

For writing ink the Romans employed, first, the juice of mulberries, then a kind of imperfect Indian ink, for which Dioscorides has given the receipt: three parts of lamp black with one part of gum. It is probable that an ink of this kind was in use among the Greeks. It was probably only semi-fluid, and required to be ground up.

The ancients used various colored inks, which were probably pigments suspended in water.

They dyed leather black with gall nuts and copperas, but this preparation was not employed as an ink till the ninth century of the Christian era. It is, moreover, less solid than the inks with a base of lampblack. If the manuscripts found at Herculaneum had been written with our ordinary ink they could never have been deciphered.

We have made no additions to the list of black colors based on carbon, but we have greatly improved the art of black dyeing.

Black, in the strictest sense, does not exist. It is merely relative, and appears black only when seen alone. But if we place two different blacks in contact they each take a different tint by the force of contrast. The art of the modern black dyer consists in obtaining these shades at will, a matter which the ancients appear to have overlooked.—*Teinturier Pratique—Chemical Review.*

Zinc Powder.

Zinc powder having now a practical utility in the treatment of color, etc., a method for ascertaining its quality becomes essential.

If zinc powder is brought in contact with sulphuric acid and bichromate of potash, using more than double the quantity of the last theoretically needful, there is no escape of hydrogen, but the hydrogen in the nascent state reduces the chromic acid to chromic oxide.

To one gramme of the zinc powder add 100 cubic centimeters of a solution of pure melted bichromate of potash (say 40 grammes per liter), and stirring diligently, add twice, each time, 10 cubic centimeters of dilute sulphuric acid, and allow it to act for a quarter of an hour. When the zinc powder is completely dissolved, save a small residue which always remains, an excess of sulphuric acid is added, and 50 cubic centimeters of a strong acid solution of sulphate of iron (say 200 grammes per liter), whose value with respect to the solution of the chrome has been already determined. A slight excess of the latter is then cautiously added, and titrated back with the acid solution of chrome till a drop of the liquid is no longer colored blue by red prussiate. The quantity of the bichromate of potash consumed, multiplied by 0·66113, gives the quantity of real metallic zinc present in the sample.—*V. Drewsen, Zeitschrift für Analytische Chemie.*

Preparation of Benzoic Acid.

Prof. Rudolf von Wagner has devised an improvement over the old method of distilling the gum benzoin and driving out the acid by heat. He dissolves the benzoin resin in 3 or 4 pints strong acetic acid, decants the brown solution, and adds 4 parts boiling water. The resin separates upon dilution as a gray-brown mass, and is removed by filtering. When the filtrate cools, a large portion of the benzoic acid crystallizes out, while a second portion may be obtained by evaporating and partially neutralizing with lime. On a large scale, of course, the acetic acid could be recovered from the acetate of lime solution.

The resin that is precipitated from the acetic acid solution, when dried and fused, has a pleasant odor of storax, and may be employed to impart a pleasant odor to sealing wax, or for making fumigating pastilles and powder.

The solubility of benzoin resin in acetic acid should give it other uses in perfumery, as in disinfecting smoking essences. Tolu and Peru balsams and storax are also soluble in acetic acid.

Glucose from Rags.

The *Revue Industrielle* states that a German manufactory is turning out over a ton a day of glucose made from old linen rags. These rags, which are composed of hard vegetable fibers, are treated with sulphuric acid, which converts them into dextrine. The latter product thus obtained undergoes a washing with milk of lime, and is then treated with a fresh supply of acid stronger than the former, when the mass is at once transformed and crystallizes into glucose, of which "rich" confections and jellies may be made. The process is said to be a very cheap one, and the glucose chemically identical with grape sugar.

A strong outcry, however, has arisen against the manufacture of grape sugar from rags, and the enterprise is understood to be in danger of being interfered with by the German Government.

Action of Salts on the Kidneys.

MM. Richet and Moutard-Martin have continued their researches on the effects of injecting various substances into the veins, and have communicated their results to the Académie des Sciences. They find that distilled water injected into the veins, far from being, as might have been anticipated, diuretic, arrests the ordinary secretion, even when the quantity thrown in amounts to ten grammes for each kilogramme of the total weight of the animal (1,544 grains to each 2·2 lb. av.). In smaller quantities, as five grammes to each kilogramme, it checks without arresting it. In larger quantities it permanently arrests the secretion, and the function of the kidney cannot be re-established. All substances which are either normally or accidentally discharged by the urine are diuretics, if they occur in the urine in larger quantities than natural; in fact their elimination induces the discharge of a certain quantity of water. The beginning of the diuresis coincides exactly with the commencement of the elimination. The condition of concentration of the fluid injected appears to matter little in the effects produced on the renal secretion, for the polyuria seems to be due exclusively to the elimination of the salts injected. In a therapeutical point of view it is obvious that diuretic remedies should be looked for among the substances that are normally found in the urine, as urea, the chlorides, and phosphates, or among those that readily escape by the kidneys, as sugar.—*Lancet.*

Iodide of Starch in Poisoning.

As a general antidote in poisoning, Dr. Bellini, in a paper read before the Medical Society of Florence, Italy, recommends iodide of starch. It is free from any disagreeable taste, and does not possess the irritating properties of iodine, so that it can be administered in large doses. He has made numerous experiments, and states as a result of these, that at the temperature of the stomach and in the presence of the gastric juice the iodide combines with many of the poisons, forming in some cases insoluble compounds, in others soluble compounds, which are harmless, so long as they do not exist in too large quantities. He recommends it as safe in all cases where the nature of the poison is unknown, and as especially efficient in cases of poisoning by the alkaloids and alkaline sulphides, by ammonia, and especially by those alkaloids with which iodine forms insoluble compounds. In cases of poisoning by salts of lead and mercury, it aids the elimination of these compounds. In cases of acute poisoning, an emetic should be employed soon after the administration.

Vaccination and Smallpox.

At a late public meeting in London, under the auspices of the National Health Society, Mr. Ernest Hart delivered an important address on the relations of vaccination to public health. Dr. Andrew Clarke presided, and, according to the London *Times'* report, in introducing the speaker he remarked that ever since the introduction of vaccination there had been two opinions on the subject. One party had held that it was an almost unmixed good to mankind—that it had checked the ravages of a loathsome disease, and that the dangers of this disease had been so lessened that its fatality was almost banished in those who were vaccinated. On the other hand, the opponents of vaccination held that it was an almost unmixed evil—that it had neither lessened the disease nor the mortality from smallpox; that it had introduced other and great diseases into the human frame; and that for those who practiced it hanging was too good. Now, into this conflict of opinion, somehow or other, there had been imported a passion which belonged to a strong conflict, and this passion had arisen, perhaps, from an inadequate view of the whole subject. With this passion raging on both sides, honest and simple folks outside were hardly able to judge of the side to which truth belonged. The question had now passed from the press and the platform to Parliament, and as legislation was likely to follow—legislation which would be of infinite good or infinite evil to the public—the National Health Society had had to find one of a calm and judicial mind who would lay the facts on both sides before the public.

Mr. Hart commenced his lecture by stating that, having been asked for information with regard to the statements of the anti-vaccinators, he had been able to refer his inquirers to the standard works on the subject and to statistics of the Registrar-General; but what seemed to be wanted was some plain, practical, and direct answer to the specific allegations of the anti-vaccinators. He set himself to prepare such a statement, and in reading the statements of anti-vaccinators he was astonished to find their literature made up of surprising misstatements, misquotations, and absurd descriptions of physiological subjects, and those who imbibed knowledge from these statements—and, generally speaking, they were the classes least able to judge—were examples of the aphorism, "a little knowledge is a dangerous thing," and suffered much evil from these misleading facts.

Mr. Hart then went into a lengthy history of the ravages which smallpox had caused not only upon the British, but other peoples of the world, and he remarked that if the like mortality occurred in England now to that which was constant in the olden time, before the introduction of vaccination, the annual death rate from smallpox would be 70,000. Before the days of vaccination a third of all the deaths of children arose from smallpox, and all classes suffered from it. This was instanced from the fact that King William III. had his constitution broken from it; and lost, besides other members of his family, his wife, mother, and father from the loathsome disease. The speaker quoted Macaulay's words lamenting that, while the plague had visited the country twice, the smallpox was constantly in our midst in olden time, cutting off vast numbers of our people, and even when it spared the life of a child it made it a changeling, at the sight of which the mother shuddered.

He then went minutely into each of the allegations of the anti-vaccinators and showed their fallacy, strengthening his case by quotations from the Registrar-General's statistics, from Mr. Simon's letter to the President of the General Board of Health, and from the evidence taken before the select committee of the House of Commons in 1871. In particular, he devoted much time to the allegations that vaccinations had not diminished the mortality from smallpox, that it did not ward off an attack of smallpox in the individual, and that it caused increased mortality from other diseases. He brought forward copious statistics to show the inaccuracy of these allegations, and showed, on the contrary, from the accumulated facts of the last eighty years, how large an influence vaccination has in checking smallpox and in modifying its course in those vaccinated individuals who caught it. He gave figures to show that a thoroughly vaccinated person has only one-seventieth of the chances of catching smallpox that an unvaccinated person has; and that if he be attacked by the disease he has fifty times as many chances of recovery as a person unvaccinated. He explained the inaccuracy of the idea that vaccination inoculated other diseases, and pointed out that, as regards syphilis, the danger was infinitesimal, while, on the other hand, there was the enormous assured advantage in vaccination of prevention of mortality from smallpox. Mr. Hart insisted strongly on the necessity of vaccination being thoroughly performed, and of revaccination at puberty, and he made certain suggestions designed with a view to make vaccination more general and thorough. He summed up the evidence in favor of vaccination, which he described as overwhelming.

ORANGES AND LEMONS.—It is stated that the Mediterranean supply will be very limited this year, orange and lemon trees bringing forth, quite as olive trees, a full crop but every two years. Besides, the small crop has itself been seriously damaged by frost, so that complaints are general in Sicily, Naples, and on the Adriatic coast.

TO REMOVE INK STAINS.—Take of muriate of tin, 2 parts; water, 4 parts. To be applied with a soft brush, after which the paper must be passed through cold water.

The Canal.

The House Committee on the Interoceanic Canal lately had before it Mr. Menocal, Civil Engineer, United States Navy, who has made several surveys on the isthmus, and heard his statement as to the relative advantages and disadvantages of the Nicaragua and Panama routes. Mr. Menocal strongly favored the Nicaragua route as being 660 miles shorter than the Panama route between San Francisco and New York, and because of the greater salubrity of its climate, the better supply of building material, and its relative cheapness of construction. He expressed his conviction that the cost of the Nicaragua canal would not exceed $70,000,000, while that of a sea-level canal *via* the Panama route would probably be $400,000,000. The latter he considered as commercially impracticable. He admitted that the Nicaragua route would consume more time on account of its greater length and locks, and that the annual expense of maintaining it would be probably twice as great, but that these features were compensated by its lesser cost.

The Committee also had before it Commodore E. P. Lull and Lieut. Frederick Collins, United States Navy, who entertained the Committee, so says *Engineering News*, with very interesting arguments in favor of the Nicaragua canal route.

Lieut. Collins has been associated with nearly every isthmus survey that has been made in the past ten years. He was not, however, connected with the survey of the Panama route made in 1875 under Commander Lull.

Lieut. Collins has made a study of the wind and water currents of the Pacific coast in the vicinity of Panama, and exhibited a chart to illustrate his paper. The belt of calms, some 1,200 miles wide, reach from the coast of Panama westward. A strong current of northwest winds blow down the Pacific coast from San Francisco the greater part of the year, their width from the coast diminishing as they approach Panama. A similar wind comes up along the South American coast, reaching some 500 or 600 miles from the coast. These currents seem to rise on meeting and ride over the belt of calms. They, however, produce a disturbance of the calms belt near the coast of Panama that is well known as an area of vexatious squalls, calms, and delays. Sailing vessels leaving Panama for San Francisco take a course south, trending along the South American coast to 10° south latitude, and then southwest and west from 600 to 800 miles west of Panama before finding a wind to help them northward, and make the trip to San Francisco in 36 to 40 days. Vessels leaving the coast of Nicaragua, say at Brito, following the course projected by himself, would be north of the calms belt, and standing westward would get outside of the down coast currents of both wind and water, and be able to reach San Francisco in 23 to 26 days, on a course of 3,240 miles, while the sailing course from Panama to San Francisco is some 5,350 miles, although Panama is only some 500 miles south of Nicaragua, or Brito; so that the wind and air currents of the Pacific Ocean near the coast of Panama and its isthmus give the Nicaraguan canal route an advantage of some thirteen to fourteen days over a route *via* Panama.

THE NICARAGUA ROUTE.

Commander Lull exhibited a map of Nicaragua, explanatory of Mr. Menocal's report of surveys. The old Nicaragua transit company, which ascended from the Atlantic *via* the San Juan, traversed Lakes Nicaragua and Managua, and thence to the Bay of Fonseca. Lake Managua being higher than Lake Nicaragua, additional locks would be required, and the stretch of country between Managua Lake and the Bay of Fonseca being almost entirely volcanic *débris* (ashes and sand), does not hold the water that falls, and wells from 100 to 300 feet deep are made to get water. This section of canal would need to be concreted to render it tight. This route would be about 300 miles long.

The surveys made by Messrs. Childs & Fay, in 1850–1, for the American Atlantic and Pacific Ship Canal Company, were *via* the San Juan river to the Lake Nicaragua, and directly across the lake and *via* Rios Lajas and Grande to Brito. Fourteen locks were to be used on each side of the lake.

The survey made by Mr. Menocal followed the same route up to and across the lake, but left the lake some miles north of the Rio Lajas route, with better results. This route leads into the bed or valley of the Rio Grande a torrent in the rainy season, which could scarcely be controlled. It is believed that thorough examination will show the practicability of turning the head of the Rio Lajas with Lake Nicaragua by a deep cut, and render the bed of the stream available for the site of the canal, which will very materially lessen its cost for this section.

The southwestern shore of the lake is of rock, and would require rock excavation under water to provide a proper depth of channel to reach the Pacific portion of the canal. The ridge to be cut through on the Pacific side is 130 feet high, and the cutting averages 54 feet for six miles.

After passing this cut, the excavation and embankments are equalized, as in railroad work. An artificial harbor will need to be provided at Brito, by excavating a basin in the swamp flats at the mouth of the river, and protecting it from the sea by a dike. The bed of the lake at the outlet into the San Juan at Fort San Carlos, is very shallow, but is composed of the volcanic sand and ashes that is brought into the lake during the rainy flood season, which gravitate toward the outlet. [The map shows several islands near the outlet of the lake.] A channel will need to be dredged for this approach to the head of the river for a distance of nine miles. It is believed that this channel will not be difficult to maintain, as the material is very tenacious.

The Rio San Juan has several rapids above the mouth of the San Carlos, which are to be passed by means of short stretches of independent canal, and the remainder of the river is to be improved by the slack water system. [The San Carlos enters at about half way from the lake to the sea.] That portion of the river below the mouth of the San Carlos is entirely destroyed for purposes of navigation by being partially filled up by the detritus brought down by the San Carlos and Serapaqui, which drain large areas to the southeast in Costa Rica. The San Carlos has been so flooded as to carry back water 40 (?) miles up the San Juan [quite up to the rapid near the outlet of the lake]. The first dam above the mouth of the San Carlos will arrest this backwater. On account of the silted condition of the bed of the San Juan below the mouth of San Carlos, an independent canal is necessary from the San Carlos to the sea. In some places the spurs to be pierced are very high—in one place about 180 feet high—but Mr. Menocal, who is consulting engineer to the government improvement of the San Juan, has been allowed to visit the locality since the surveys were made, and is confident that a much more favorable and cheaper line can be now laid, saving, probably, some seven miles. It is the intention to divert the Rio San Juan into its old bed (the Colorado), and thus relieve the harbor at its present mouth from the shoaling that is going on from the detritus brought down during the rainy season. This will insure a good harbor at San Juan.

Lake Nicaragua rises and falls because of the rainy season about six feet, the time of oscillation occupying some six months. The area of the lake is about 2,700 square miles, and the area drained into it is some 8,000 square miles.

In studying the region of the isthmus, time is an essential element to get at its meteorological and climatic conditions, and Messrs. De Lesseps and Dirks have not been long enough on the isthmus to form any just idea of the difficulties which will arise in the construction of a sea-level canal. The mouth of the Colorado river shoals very fast. Cattle were grazing where I once landed from twenty feet of water, and a canoe would now ground where, as navigation officer, I once sailed a vessel. There are three locks above the San Carlos and seven below. The passage of a ship or other vessel through a lock will occupy about thirty minutes.

AGRICULTURAL INVENTIONS.

Henry R. Burdge, of Cape Girardeau, Mo., has patented an improved sulky cultivator, so constructed as to loosen and mellow the soil and cut off the roots of grass and weeds without turning the soil over. It may be readily adjusted to work deeper or shallower in the ground, and will work at a uniform depth in uneven ground.

Mr. Gustaf Holcomb, of Stillwater, Minn., has patented an improved thrashing machine. This invention relates specifically to improvements in the grain and straw carrying mechanism of thrashing machines. It cannot be clearly described without engravings.

Mr. Thomas B. Ashford, of Clinton, N. C., has patented an improved grazing post for stock, which will prevent twisting of the halter, and which can be easily secured and adjusted. It consists in a balanced lever, to which the halter is attached, pivoted to the top of a post, provided with a screw at the lower end for screwing it into the earth, and braced by a number of hook bars, which are driven into the earth to give it greater rigidity.

Mr. Adam C. Hendricks, of Duffield Station, W. Va., has patented an improvement in fertilizer attachments for seed drills. It is adapted to operate independently, but will in general be made an attachment of a seed drill. The improvement pertains to a rotating flanged wheel for discharging the fertilizer, and an adjustable gate co-operating therewith, for regulating the quantity of fertilizer discharged.

An improved device for planting corn in perfect check row, so that the rows shall be straight each way, and at the same time distributing a limited amount of fertilizer to each hill as it is planted, has been patented by Mr. Henry F. Graetzel, of St. Joseph, Md.

Mr. Thomas Delaney, of Waterloo, N. Y., has patented an improved plant protector. The object of the invention is to provide an efficient device for preventing heavy rains from washing the soil from about the roots of plants, while it gives the water free access to the plants, and also permits the air to circulate about them.

Faber's Talking Machine.

A great many years ago a talking machine, the invention of one Herr Faber, was exhibited in New York, and an engraving of it was published in the columns of this paper, as, no doubt, some of our oldest readers remember. We are reminded of that famous machine by an account in our English contemporaries of an improved talking machine exhibited by the successors of the original Faber before the Physical Society, and privately, for closer examination of its novel mechanism, to several well known scientific gentlemen.

This machine is said to be the product of the continuous labor and study of two members of the same family. It was begun in 1815 by Joseph Faber, and so far elaborated in 1841 that it was exhibited in that year to the King of Bavaria.

On the death of the original inventor, he bequeathed the machine to his nephew, the present owner, also named Joseph Faber, who had been associated with him in its construction, and who, report says, has greatly increased its power of articulation.

The Coming Comet.

In a letter to the Boston *Advertiser*, Professor Benjamin Peirce, of Cambridge, says that he is fully persuaded that the comet recently discovered by our eminent American astronomer (Dr. Gould in South America) is a return of the wonderful comet of 1843, which has been considered as in many respects "the most interesting of any on record" (Cooper's Cometic Orbits). The first record of this comet is in 1770 before Christ, with an average period of about seven years. The subsequent visible and recorded returns are, 370 before Christ, 252 and 183 before Christ, and after Christ 336, 422, 533, 582, 708, 729, 882, 1077, 1106, 1208, 1313, 1362, 1382, 1402, 1454, 1491, 1511, 1528, 1668, 1689, 1702, 1843, and 1880."

The appearance of this comet in 1843 is thus described by Professor Peirce:

"About noon on the 28th of February, 1843, groups of people in many of the towns of New England, especially in Portland, Maine, collected at the corners of the streets, gazing up toward the sun. Protecting their eyes in the shadows of the houses, they saw a brilliant object close to the sun. Such a marvelous spectacle had never before been seen. A thoughtful sea captain, Mr. Clarke, brought out his sextant, and repeatedly measured the distance of the strange object from the limb of the sun. These unique observations are on record, and, submitted to rigid criticism, attest the accuracy of the observer. In about a week from this time a wonderfully brilliant tail of a comet was seen skirting the horizon soon after sunset, and reaching more than one-third of the way round the sky. It was now a tail without a head, as it was at first head without tail; but they were members of the same comet. The best determination of its path was accomplished by the distinguished astronomer, Sears O. Walker. At its perihelion it passed nearer the sun than any known comet, with the single exception of that of 1680, computed by Sir Isaac Newton, and in the discussion of which in the Principia he broached the first approximation to the true theory of the cometary tail. These two comets approached so close to the sun that it would seem quite possible that they touched its surface, or, at least, swept in nearer than the solar corona. It would not have been an absurd hypothesis, that they were ejected from the sun at the time of penetration, had it not been for the fact that the comet of 1680 was seen on its way down to the sun, and for the remarkable phenomenon which we are about to describe concerning the comet of 1843. It may be claimed, as a not impossible hypothesis, that each of these comets was at some former time the product of a solar eruption, in accordance with Buffon's theory of the origin of comets. It would only involve a force which would double the greatest velocity given to the solar field of hydrogen. But a juster interpretation of the phenomenon, and one which avoids the necessity of an extravagant volcanic action, is to be found in the relation between the comets and the meteors. It is simply the splash of the falling meteors. In about an hour and a half the comet of 1843, like that of 1680, went round the sun from one side to the other. What would have become of the tail, which was reaching out about 100,000,000 of miles from the sun to the earth's orbit? There have been those who have actually adopted the incredible, I may say the impossible, hypothesis that the tail rotated through this immense circuit, developing a centrifugal force which all the united powers of the universe could not have sustained. No! The comet practically left its tail behind it, and began to grow a new tail as it receded from the sun. There were thus two tails nearly side by side. The new tail was distinguished because it commenced at the head of the comet, whereas the old deserted tail began without any head at some distance from the nucleus, and extended further from the sun than the new tail. That such should be the phenomena of this comet was suggested by a geometer, without knowing that it had been actually observed. It was as veritable and honest a prediction as if it had been made previous to the observation. A double tail was observed on the first four nights after the comet's appearance at noonday. The visible separation of the two tails only lasted for a few days, because the earth passed almost at once into the plane of the comet's orbit, so that one tail eclipsed the other."

Conversion of Cane Sugar into Grape Sugar in Cooking.

At a sanitary convention in Grand Rapids, Michigan, recently, the President of the State Board of Health called attention to a bad practice among cooks, by which cane sugar is converted into grape sugar in cooking, thereby losing more than half of its sweetening power. Some women, he said, will put the sugar in with a mass of acid fruit to be cooked, and keep cooking and keep adding sugar while it keeps on growing sourer, until at last they will use two and a half times as much sugar as they ought to secure the desired result. The cane sugar has been changed to grape sugar. Now, if the sugar had been added after the fruit was cooked, much less would have been required, and the result would have been far more satisfactory.

One Week's Exportation of Live and Fresh Meat.

During the first week of March the steamers sailing from New York to English ports carried 1,221 head of cattle, 650 sheep, and 300 hogs, alive; also 2,408 quarters of beef, 850 carcasses of sheep, and 605 tons of fresh meat, several steamers reporting the dead meat carried only by weight. This is the largest shipment in one week for several months.