STORMY PETREL.

The stormy petrel, known to sailors as the Mother Carey's Chicken, is hated by them after a most illogical manner because it foretells an approaching storm, and therefore by a curious process of reasoning is taken for its cause.

This bird, says "Wood's Natural History," has long been celebrated for the manner in which it passes over the waves, pattering with its webbed feet and flapping its wings so as to keep itself just above the surface. It thus traverses the ocean with wonderful ease, the billows rolling beneath its feet and passing away under the bird without in the least disturbing it. It is mostly on the move in windy weather, because the marine creatures are flung to the surface by the chopping waves and can be easily picked up as the bird pursues its course. It feeds on the little fish, crustaceans, and mollusks which are found in abundance on the surface of the sea, especially on the floating masses of algæ, and will for days keep pace with a ship for the sake of picking up the refuse food thrown overboard. Indeed, to throw the garbage of fish into the sea is a tolerably certain method of attracting these birds, who are sharp-sighted and seldom fail to perceive anything eatable. It is believed that the petrel does not dive. The word petrel is given to the bird on account of its powers of walking on the water, as is related of St. Peter.

It does not frequent land except during the breeding season, and can repose on the surface of the ocean, settling itself just at the mean level of the waves, and rising and falling quietly with the swell. This petrel breeds on the northern coasts of England, laying a white egg in some convenient recess, a rabbit burrow being often employed for the purpose.

Mr. Reid, of Kirkwell, Orkneys, has kindly given the following short but graphic description of these birds while breeding: "They land on our islets every breeding season. I have had them handed to me alive, frequently together with their eggs, and stinking little things they were, as bad, I suppose, as the fulmar."

This bird possesses a singular amount of oil, and has the power of throwing it from the mouth when terrified. It is said that this oil, which is very pure, is collected largely in St. Kilda by catching the bird on its egg, where it sits very closely, and making it disgorge the oil into a vessel. The bird is then released and another taken. The inhabitants of the Faroe Islands make a curious use of this bird when young and very fat, by simply drawing a wick through the body and lighting it at the end which projects from the beak. This unique lamp will burn for a considerable period. Sometimes the petrel appears in flocks, and has been driven southwards by violent storms, some having been shot on the Thames, others in Oxfordshire, and some near Birmingham.

The general color of this bird is sooty black, and the outer edges of the tertials and the upper tail coverts are white. Its length is barely six inches.

STORMY PETREL.—*Thalassidroma Pelagica*

Adulteration of Soaps.

Consumers of soap, says a writer in the *Deutsche Industrie Zeitung*, should not neglect to inform themselves of the real value of the wares they buy, and to prove the absence of intentional adulterations. A very old trick is to increase the weight of soap with water, but as ordinary soap soon loses this by evaporation in the air, this deception will not succeed unless the soap is sold off quickly. There are two other methods of overweighting. One consists in putting in chemicals that are adapted to hold this excess of water in the soap, so that it loses little or nothing in weight by lying. Another way is to add some mineral substances, soluble or insoluble, to increase the weight and diminish proportionally the value of the soap. Artificially increasing the amount of water and adulteration with worthless chemicals pay well, and they do a fine business by duping their customers.

It is no wonder that a housekeeper does not have her toilet soap and family soap analyzed, because she uses comparatively little of it, and is satisfied if it looks good and makes a good suds. When large consumers, however, neglect to submit their soap to an examination they may suffer considerable loss. If soap was tested oftener than it is more frequent complaints would be made public, and better wares would result. There is soap in the market that contains 75 per cent water, and externally cannot be distinguished from soap that contains only 12 per cent. It is easy to see how great a difference there may be in the value of two specimens of the same price. By simply increasing the amount of water doors and gates are open for deception in soap making, so that many manufacturers make a profit of a hundred per cent by selling water instead of soap.

Gelatinous substances are most frequently used to retain the water in soap, and are at the same time an excellent filling. Alumina in the hydrated form performs this service best. The author detected this substance in six samples of soap, which had over 60 per cent water, and were sold by their manufacturers at the same price as another manufacturer sold soap with 24 per cent. Other gelatinous substances, like silica and organic substances, are used. They are easily detected by chipping up the soap and dissolving it in alcohol, in which they are insoluble, while pure soap is perfectly soluble. The undissolved residue may be filtered out and more carefully examined. Hot water will dissolve the gelatinous substances if they are organic, like gelatine or glue, leaving alumina, silica, etc., unaffected. By evaporating the aqueous solution and weighing the residue the quantity of gelatine can be quantitatively determined. The silica and alumina can be dried, then ignited in a platinum or porcelain crucible, and weighed.

Waterglass is frequently added to soap, and, although it is not an injurious ingredient, such soap can be made cheaper, and should be sold as waterglass soap.

In some samples the author found starch, gypsum, chalk, clay, phosphate of lime (bone ash), and barytes, or blanc fixe, as the adulterants. All these can be separated by dissolving the dry soap in alcohol. The alcoholic solution may be evaporated to dryness, dried at 212° Fah., and weighed.

The author found more adulteration in the Berlin soaps than any other; but in the little city of Munster, out of 12 samples from different factories, 5 were adulterated.

The author neglects to mention the fact that impure fats in a state of incipient decomposition are often employed, perfumes being added to disguise the odor.

Crystals of Hæmine.

F. Högyes has examined crystals from the blood of men, oxen, swine, sheep, dogs, cats, rabbits, guinea pigs, mice, pole cats, poultry, pigeons, geese, ducks, *Rana esculenta* and *temporaria*. All have one only crystalline form. They belong to the monoclinar or triclinar system, probably the former.

THERE are now produced from Indian corn millions of pounds of starch and glucose annually, of which a large quantity is exported. These substances carry away no mineral fertilizers; they come entirely from the atmosphere.

Detection of Sulphide of Carbon in Mustard Oil.

An interesting case of supposed adulteration of oil of mustard has recently attracted attention in Germany. A certain firm in Leipsic imported some oil of mustard from Russia, and suspecting that it was adulterated with carbon disulphide submitted it to an examination which resulted in the detection of a considerable amount of that substance, which was distilled off and identified. As the Russian firm could not deny its presence there, they attempted to defend themselves by saying that it was a by-product formed from the mustard seed. The seed used in Russia belong to the variety *Sinapis juncea*, while that used in Germany is *Sinapis nigra*.

Prof. A. W. Hofmann, of Berlin, who may be called the father of mustard oils, was employed as expert. He obtained some of the Russian mustard and prepared 200 grammes of the oil from it. It had all the properties of normal oil of mustard, and on distillation the temperature soon rose to 150°. The oil was tested for carbon disulphide in the usual manner, viz.: the distillate was mixed with absolute alcohol, alcoholic potash added, and heated to boiling. It is then acidified with acetic acid, and a solution of sulphate of copper added. If carbon disulphide is present a yellow precipitate of xanthogenate of copper is formed. Prof. Hofmann failed to detect any in the oil of mustard by this test until he had modified it as follows: 50 grammes of the oil were placed in a flask on a water bath, and the flask provided with a delivery tube that dipped into alcoholic potash. On drawing a current of air slowly through both fluids for a few hours, it was found that the potash gave, after adding acetic acid, the yellow precipitate with copper sulphate. This proved that the oil did contain a trace of the suspected substance, but gave no means of determining its quantity, as the xanthogenate cannot be dried without partial decomposition.

Some seven or eight years ago Prof. Hofmann prepared triethyl-phosphine by the action of hydrogen phosphide on ethyl iodide under pressure. He recollected that it was a very delicate test for carbon disulphide, and resolved to test it now. He put the oil in a tubulated retort on a water bath, and connected the receiver with three wide test tubes containing caustic soda solution on which floated an ethereal solution of triethyl phosphine. On passing a current of dry carbonic acid through the whole apparatus, if carbon disulphide is present, the phosphine solution soon turns rose red, and in a little while pink crystals of $(C_2H_5)_3PCS_2$ are formed. If these crystals are collected on a weighed filter and dried in vacuo, each 100 parts will represent 39·1 of carbon disulphide. Professor Hofmann found that the oil made from Russian mustard contained 0·37 to 0·41 of carbon disulphide; that from black mustard seed 0·56 to 0·51; and artificial oil of mustard from allyl iodide and sulphocyanide of ammonia contained only 0·32 per cent. B. B.

A New System of Grape Culture.

The San Mateo (California) *Journal* says: On the Alpine Ranch, occupied by Charles B. Sears, there is a vineyard of several thousand vines of all descriptions of grapes, foreign and domestic. For six or seven years the vines have been each year, scientifically, as it is called, pruned by cutting back to the traditional two or three buds, and the ground has been regularly plowed and highly cultivated. The vines resisted all this kind treatment and refused to bear well, although making each year a magnificent growth of wood, and showing a very fine healthy stock and root. An experiment was tried with the vineyard this year; a small portion was pruned and cultivated in the usual manner, the larger portion being left entirely unpruned and uncultivated. The result is remarkable. In the latter portion of the vineyard the ground is fairly covered with fine well ripening grapes, making a yield far beyond the ordinary crop of average grapevines, while in the pruned and cultivated portion the vines exhibit but few bunches of perfect grapes.

This great success seems attributable to two causes, chiefly: First, that cultivation and pruning caused too great a growth of wood, thus drawing away from the fruit-bearing tendency; second, the pruning caused the vines to have a high,

straight stem, thus elevating the fruit from the ground into the cool moist touches of the fogs, at times; while letting the vines run caused them to spread out flat on the ground, and the grapes lying immediately upon the warm earth, and in contact with it, are thus sheltered from the adverse influences operating higher above, and were thus fully developed and ripened.

Citric Acid Again.

It never rains but it pours, seems specially true of inventions and discoveries. Several inventors will produce the same instrument simultaneously, each ignorant of what the other has done. Three or four chemists discovered chloroform independently of each other nearly half a century ago. This seems to be the year for citric acid. In a recent number we described the synthesis of citric acid by Grimaux and Adam, from dichlorhydrine. On the 15th of August Kekulé presented a paper to the Berlin Chemical Society, in which he described a totally different synthesis of the same acid. He set out from malic acid, the acid of unripe apples, but one that has been made artificially too. In 1834, Wislicenus had converted it into acetyl-malic acid by treating diethyl-malate with acetyl chloride. The following formulæ will explain this:

Malic acid.	Diethyl-malate.	Acetyl-malic ether.
COOH	$COO(C_2H_5)$	$COO(C_2H_5)$
CH_2	CH_2	CH_2
CHOH	CHOH	$CHO(C_2H_3O)$
COOH	$COO(C_2H_5)$	$COO(C_2H_5)$

The last named ether was dissolved in ordinary ether, and, treated with metallic sodium and monobromo-acetic acid, was allowed to act upon the product. Of course the bromide in the latter combined with the sodium in the former to form bromide of sodium, which separated because it was not soluble in ether. The other product was boiled with alcoholic potash, an operation known as saponification. This formed a potash salt insoluble in ether. From this he made the lead salt, and then set the acid free by passing sulphydric acid into its solution. At the time of his making this communication he had not purified the acid, but its reactions with lime salts were such as to satisfy him that it was in reality citric acid which he had obtained.

Andreoni, an Italian, has also given notice that he is trying to make citric acid from the triethylic ether of malic acid by means of sodium and bromo-acetic ether; a method quite similar to that of Kekulé.

It is somewhat interesting to know that Germany, Italy, and France have each solved this problem together, yet independently. England and America must look to their laurels.

Farming in Japan.

Milton S. Vail, a missionary in Japan, gives, in the *Methodist*, the following account of Japanese farming:

"The farmers in Japan seem to operate on a small scale. All the land belongs to government, and all have to pay a ground rent. Wheat, barley, rye, and buckwheat are grown in rows, the weeds being kept out by hoeing. It seems strange to see all their grain growing in rows, but no doubt good crops are thus produced. Rice is the chief product of Japan. The earth nearly everywhere is black, and the black soil of the valleys, when well cultivated and made to hold the water from the neighboring hills, makes good rice fields. The soil is broken by manual labor. Men go in to the mud up to their knees, and with a long-bladed hoe turn the earth over. Horses are used to harrow it down, and when ready, the rice plants are set out by hand. The rice of Japan is very fine, and the Japanese know how to cook it. With them it is the principal article of food—a little rice, with pickles and tea, often constitutes the meal. The people do not know how to make bread, but seem to be very fond of it when they can get it of foreigners. They have flour which they use in various ways in the simplest kind of cookery. I noticed in coming to this place (Hakone, a mountain town forty-five miles from Yokohama) that at some of the inns, instead of tea, they gave us a drink made of pounded wheat. Potatoes, sweet potatoes, egg plants, corn, melons, cabbages, onions, and turnips are also grown, and other vegetables, the names of which I do not know, and never saw in America. I think all the vegetables grown in New York can be cultivated here. Of fruits, we have peaches, plums, oranges, strawberries, pears, and persimmons, also figs."

The Inventor of the Bell Rope on Trains.

Captain Ayres, whose death at a great age was noted recently, was the inventor of the present bell rope system on railroads. When he commenced running on the New York and Erie Railroad the locomotive had no cab for the engineer—nothing but a framework. There was no way to go over the cars nor for the engineer to communicate with the conductor when the train was in motion. In those days, instead of the conductor running the train, as at present, the engineer had entire charge, and the conductor was a mere collector of fares and tickets. In 1842 Ayres inaugurated a system of signals by a cord running over the cars to the engine, where it was attached to a stick of wood. Ayres' engineer, a Dutchman named Hamill, resented the innovation, cut the stick loose, and the conductor and engineer had a fight at Turner's over the matter, Ayres whipping his engineer badly, and thereafter conductors, and not engineers, have had charge of trains. Soon after the bell rope and gong went into general use.—*Paterson (N. J.) Press.*

THE FAN AS AN OBJECT OF HYGIENE.

Says a French exchange—the *Journal d'Hygiène*—the fan, which is used by women of all countries as an ornamental as well as useful article, has also its utility from a hygienic point of view. This can best be shown by giving a brief *résumé* of the history of fans from remote ages up to the present time. We shall find that, dating from most ancient times, the most diverse nations and races have used them; and that the caprices of fashion, while varying their forms and materials, have never succeeded at any period in throwing them out of universal use.

The papyrus, whose large leaves so long served as a writing material, was one of the first plants from which fans were made. It was in Egypt especially that its leaves were used for this purpose. It is said that the daughter of Pharaoh, who saved Moses from the waters of the Nile, held in her hand, during her walk along the banks of the river, a fan made of this very sedge. We find that in ancient Greece the first fans used were made of branches of myrtle, acacia, and plane tree. On the bass-reliefs and ancient monuments of this country we frequently see processions of bacchants bearing thyrses surrounded with ivy and vine leaves, and which, in addition to their ceremonial character, were designed to fan and shade from the sun the heated votaries of the god Bacchus. It was not till the fifth century before Christ that the peacock was known in Greece. From this epoch dates the use among Grecian ladies of the peacock's tail as a new and elegant kind of fan imported from the shores of Asia Minor, and especially from Phrygia. Euripides, in one of his tragedies, recounts how a Phrygian eunich cooled, according to the custom of his country, the tresses and cheeks of Helen, with a peacock's tail with all its feathers outspread. Dating from that epoch, whenever mention is made of the attire of women, in Greek or Roman authors, fans or peacocks' tails are spoken of. As the art of the fan makers arose the use of feathers alone came to be discarded, as they were found to be too pliable; and hence the artist conceived the happy idea of placing between each feather a thin strip of wood, which not only gave the fans a greater amount of resistance, but also made them more durable.

We frequently find in ancient pictures and on antique vases representations of this very sort of fans; and they are also mentioned in the writings of Ovid and Propertius. The female slaves who were specially employed to carry parasols and fans to shade and drive away the flies from ladies of antiquity when they appeared in public are called by Plautus *flabelliferæ*. In this respect our own modern ladies are much more modest, since they carry their own parasols and suspend their fans by a chain at their side. Fans made of peacock's feathers remained in fashion through the middle ages and up to the seventeenth century, not only in Italy, but also in England and France; but they were rather bouquets of feathers than the fans of our day, although they subserved the same end. In those times, then, peacock's feathers must have been an important article of commerce. In fact, Alexandria and other maritime ports of the Levant shipped to Venice, as well as to other commercial cities of Italy, large quantities of peacock and ostrich feathers, which were prepared in the most ingenious manner and in all possible styles. Soon, however, ostrich feathers came more in favor in fan manufacture, to the exclusion of those of the peacock. Fans of this kind, in all styles, such as were used by Italian ladies of the twelfth, thirteenth, and fourteenth centuries, are to be seen in the pictures of Titian and his brother. Toward the fourteenth or fifteenth century ladies began to wear girdles in the form of golden chains, from which were suspended their keys and other objects. From this arose the fashion still in vogue at the present day, of suspending fans from the belt by means of a small chain. This explains the object of the large ring at the end of the fan handle, which has been handed down from the past. There is a fan in the Museum of the Louvre which once belonged to Catharine de Medicis, that has one of these large rings in the handle.

The inhabitants of Africa and the savages of the shores of the Atlantic make their fans from the leaves of palm trees. In the Dutch possessions of Oceanica, the Malay women make use of the leaves of cocoa palm, pisong, and reeds, instead of fans. In the Indies fans are, as in many other Oriental lands, suspended over the bed, and moved to and fro by means of a cord, by slaves, during the repose of the master or mistress. It is from the East that come those fans made of odoriferous woods, which are calculated to render the air of an apartment oppressive and give one the headache, rather than to make the atmosphere refreshing.

Nowhere has the art of the fan maker been brought to such perfection as at Paris, where the most elegant paintings on tissues of the utmost delicacy give these objects an enormous value, such value being often further enhanced by golden ornaments and settings of precious stones. The present style of folding fan, which is such an improvement over the ancient stiff outspread fan, arose in France.

From what has been said, it will appear that if the fan—even such as it was before modern improvements were made on it—had not been a true article of hygiene it could not have resisted the everchanging caprices of fashion for so many centuries.

ENGINEERING INVENTIONS.

Mr. Burpee R. Starratt, of Truro, Nova Scotia, has patented an improved railroad frog. The absence of the ordinary heavy plates, which compose part of the frogs in common use, gives this frog great advantage, both in weight and cost, and makes it more elastic.

An improvement in high and low water indicators for boilers has been patented by Mr. Florent Ladry, of Brussels, Belgium. The invention consists in a float having only one small pipe extending close to the bottom of float and boiler, to allow the air and steam to circulate freely between the float and boiler, in order to maintain the same pressure on the inside and outside of the float.

Mr. Henry A. Ridley, of Jacksonport, Ark., has patented a spark arrester, which consists of a cone of wire gauze projecting into the smokestack and supported so as to leave an annular space between it and the stack for the escape of cinders, which are received by a cylindrical jacket surrounding the upper end of the stack.

An improvement in paddle-wheels has been patented by Mr. Theodore G. Stritter, of Batesville, Ark. The object of this invention is to lessen the time, labor, and cost in constructing and repairing paddle-wheels, while producing stronger and better wheels. The invention consists in securing the circle braces to the arms of a paddle-wheel by placing metal sockets upon the ends of the braces and attaching the sockets to the arms of the wheel.

Dr. Edward Seguin.

Probably no man ever did so much to put the work of elementary education upon a reasonable and thoroughly scientific basis as Dr. Edward Seguin, who died in this city October 27, in the sixty-ninth year of his age. This, however, without directly attacking the traditional methods of teaching.

Dr. Seguin was educated at the colleges of Auxerre and St. Louis, Paris, and early turned his attention to the education of idiots by physiological training. He established in 1838 the first school for this sort of work, achieving by his marvelous skill and patience results which won him a place in the front rank of the world's benefactors. His school became a model after which seventy-five similar institutions have organized in various countries. The French Revolution of 1848 obliged Dr. Seguin to take refuge in this country, where he spent the next ten years practicing medicine in Ohio. Subsequently he revisited France and then returned to this city. Among his more important works are "Hygiène et Education des Idiots" (1843); "Images Graduées à l'Usage des Enfants Arrières et Idiots;" "Traitement Moral Hygiène et Education des Idiots et des autres Enfants Arrières" (1846); "J. R. Pereire, Primier Instituteur des Sourds et Muets en France" (1847); "Historical Notice of the Origin and Progress of the Treatment of Idiots," translated by Dr. J. S. Newberry (1852); "Idiocy and its Treatment by the Physiological Method" (1866); "New Facts and Remarks Concerning Idiocy" (1870); "Medical Thermometry" (1871); "Prescription and Clinic Records" (1865–77); "Mathematical Tables of Vital Signs" (1865–77); "Thermomètres Physiologiques, Manual of Thermometry for Mothers, Nurses, Teachers, etc." (1873); "Official Report on Education at the Vienna Exhibition of 1873," published in 1875. Among his later essays, "The Physiological Training of the Idiot Hand" is perhaps the most valuable.

Captain R. F. Loper.

Captain R. F. Loper, for many years a prominent inventor and shipbuilder, died recently in Brooklyn. After a long and successful career as a seafarer, Captain Loper settled in Philadelphia and turned his attention to shipbuilding. Between 1847 and 1866 he constructed about four hundred vessels, among the largest being the steamship Lewis, for the Boston and Liverpool Steamship Company; the Star of the South, ten steamships for the Parker Vein Company, and the California, for the Newfoundland Telegraph Company. He also designed and constructed some fast yachts. Captain Loper was the owner of several patent rights, including the Loper propeller engine, propeller boiler, and a patent for constructing a slip so as to prevent decay of her timbers for a long period of time. During the Mexican War Captain Loper built in thirty days 150 surf boats, in which the American troops were landed at Vera Cruz. The naval officials estimated that it would take ninety days to build these boats, but on Captain Loper being consulted he agreed to furnish them in thirty days. Had the time for constructing them been as long as ninety days, General Scott would, in all probability, have been obliged to postpone his expedition against Vera Cruz until the following year. During the late war Captain Loper's services as Assistant Agent of the War Department were of signal value, and were characterized by the well-directed energy and practical success which marked his whole career.

Col. E. L. Drake.

Col. E. L. Drake, the first to sink a well in Pennsylvania for oil, and the pioneer in the petroleum business in that State, died at his home in New Bethlehem, Pa., November 7. The first well was bored in July and August, 1859. Having lost the fortune made by his earlier ventures, Col. Drake was granted in 1864 an annual pension of $1,500 by the State he had done so much to enrich. A statue to his memory is about to be erected in Titusville.