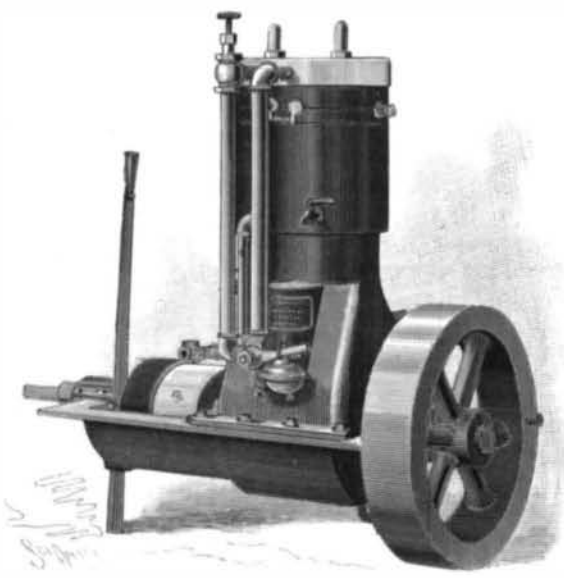
THE KING GASOLINE LAUNCH ENGINE.

The simple, compact, quiet running engine shown in the accompanying illustration is manufactured by the Charles B. King Company, of Detroit, Mich., the type having been adopted and its principal features developed as a result of extended experience with gasoline motors. The impulse is given at every second revolution only in each cylinder, whereby the products of combustion are expelled by the return stroke of the

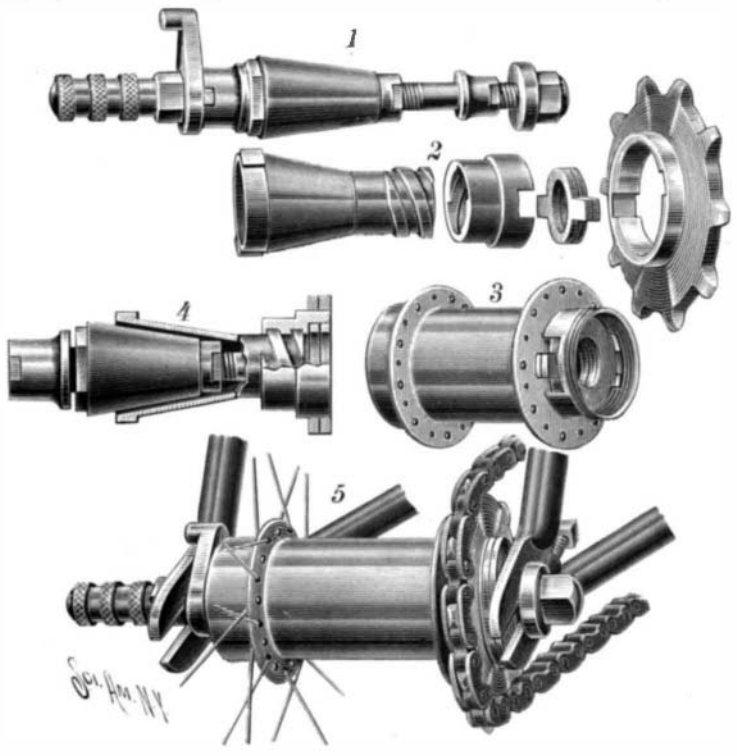


THE KING GASOLINE LAUNCH ENGINE.

piston, the exhaust being rendered perfectly silent by passing out under the water, and the incoming charge is received into a clean space where no burnt products remain. This arrangement increases the effectiveness of the explosion and enlarges the range of the mixture, the engine being also more positive in its action and not requiring the careful adjustment necessary with many other types. The flywheel is easily turned by pulling out the relief rod, two slow revolutions being enough to start the engine, and no hand crank being required. The electric igniters will last as long as the engine and do not require care or attention. The use of oil cups is entirely dispensed with, all the working parts, cylinders included, being copiously oiled by the dashing of the cranks through the oil in the crank case, the oil used being "crank case oil," costing fifteen cents per gallon. An outside supply chamber indicates the oil level and shows when it is necessary to replenish the supply. The reversing gear is made a part of the engine, and the use of a propeller with reversible blades is avoided. The engine shown in the illustration is rated at 6 horse power, but is said to develop 7½ horse power, its weight being 700 pounds. The King exhibition launch, running on the Detroit River, affords a good exemplification of the capabilities of these engines. The launch is 33 feet long and has a speed of 10·6 miles per hour.

AN IMPROVED BICYCLE BRAKE.

The accompanying illustration represents in detail the principal parts of an improved bicycle brake manufactured by the Hay & Willits Manufacturing Company, of Indianapolis, Ind., Fig. 5 showing the complete device as applied, from which it will be seen that the brake mechanism is entirely within the hub. Fig. 1 shows the axle with its friction cone of vulcanized fiber and Fig. 2 the steel sleeve or socket in which the cone is inserted inside the hub casing, the thread at one end indicating the manner in which the cone is brought to a friction bearing by means of its keyed connection with the sprocket, as further shown in the broken-away portion of Fig. 4. Fig. 3 represents the hub casing, inclosing the bearings completely and protecting all parts from dust. The brake is applied by a slight back pressure on the pedals, causing a limited reverse movement of perhaps one-sixth of a revolution on the rear sprocket. There are, as will be seen, no springs of any kind in the device, the brake action being entirely controlled by the pedals, leaving the rider free to use his hands to control his machine, and when the brake is applied at the top of a hill the rider may coast in the usual way, the brake not being released until a forward pressure is exerted upon the pedals. The wheel is checked slowly or rapidly, according to the amount of pressure used in back pedaling, and the brake is released by the application of the same amount of power by pedaling in a forward direction, and, of course, a stop can be made as readily on a slippery or asphalt road as on a dry pavement. The brake is not visible on a wheel, except as its presence may be indicated by a slight enlargement of the rear hub, and thus in no way detracts from the appearance of the machine.



THE WILLITS AUTOMATIC REAR HUB BICYCLE BRAKE.

Rich Alaskan Islands.

Large ledges of copper and gold ore have lately been uncovered on Gravina, Annette and Revillagigedo Islands, on the southeastern Alaska coast. Prospectors declare that these, together with Mary and Prince of Wales Island, contain mountains of rich ore that will make their ultimate possessors immensely wealthy. Many claims have been located on Gravina, and prospectors are rushing in from Puget Sound. The Wragel and Juneau ledges are ten to fifty feet wide, rising frequently above the level of the ground, making their development very easy. Where the work of development has been begun, the value of the ore has increased beneath the surface.

Solis Cohen, who has just returned from the islands, says The New York Times, declares that hundreds of thousands of tons can be milled or shipped to smelters without sinking shafts. Not only do the ledges extend from tidewater to the mountains in the interior, but they are also found beneath salt water. Some of these have been blasted open at low water and found very rich in gold. The islands have good harbors, where ships can call for cargoes of ore, as well as numerous mill sites and waterfalls from which power may be obtained for operating stamp mills.

The immediate opening of mines rivaling or exceling those about Juneau is expected on these islands. Gravina, the richest, lies along Nicholas Passage and Tongas Narrows, extending from four miles opposite New Metlakahtea to sixteen miles above Ketchikan.

Trolley on the Canals.

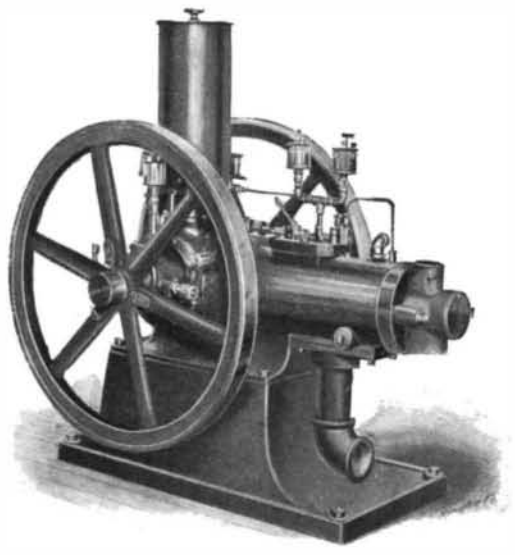
A meeting of the Cataract General Electric Company was held January 10, to consider the beginning of work under the company's charter, which permits the establishment and operation of an electric motive system along the State canals for the supplying of power to boatmen. The company has had an engineer prepare plans and specifications for the installation of an electric cableway for sixty miles along the Champlain Canal, from Whitehall to West Troy. The charter was granted several years ago, but if it is decided to carry out the plan submitted for the Champlain Canal, that will be the first work the company has undertaken to do. The cableway system proposed, it is understood, is an alongshore trolley, from which power will be supplied to motors that will haul the boats. If the proposed plan is accepted, the details of operation will probably be publicly explained. If it is a success, the problem of canal transportation is likely to be settled for some time to come.

The Current Number of the Supplement.

The current number of the SUPPLEMENT, No. 1151, contains the conclusion of Prof. Octave Chanute's "Gliding Experiments." This is one of the most important papers on the subject of aerial navigation which has been published in a long time. Like the former papers, it is illustrated by engravings made from instantaneous photographs showing the apparatus in all stages of operation. There are ten engravings in the present number. There is also an article on the "Modern Distillation of Wood for the Production of Acetic Acid, Wood Spirit and Acetone in the Pure Form." Literature upon the distillation of wood is limited. There is also an illustrated review of Prof. Lanciani's "Ruins and Excavations of Ancient Rome," and a paper by Mr. Penrose, "The Orientation of Greek Temples," and the number is concluded by a lecture by Prof. Rufus M. Jones on "Telepathy."

AN IMPROVED KEROSENE ENGINE.

The illustration represents a simple, safe and reliable engine, for which patents have been recently granted in the United States and several European countries. It is the invention of Carl W. Weiss, and is manufactured by August Mietz, of No. 87 Elizabeth Street, New York City. The basis of the explosive charge is supplied in liquid form, to be vaporized and mixed with the proper proportion of air in the engine, and a primary feature of the invention has been to produce an engine in which the fouling and clogging of the working parts so common in engines of this class shall be largely reduced, the entire construction, also, being exceedingly simple. A closed oil tank of a capacity of ten hours' run is screwed to the engine cylinder above the crank chamber, and from this tank, through a small copper tube, the kerosene is forced into the cylinder and then vaporized and mixed with the proper quantity of air, the speed being kept uniform under different loads by varying the number of kerosene injections, which is effected by means of a simple governor in connection with an eccentric on the main shaft, the quantity of each injection, however, remaining constant. In engines above ten horse power a variable charge governor is used. The water-jacketed working cylinder has an unjacketed explosive chamber in which the



THE MIETZ & WEISS KEROSENE ENGINE.

temperature is always so high that the engine is self-igniting after it has been started, the oil as it is fed from the nipple being caught by a blast of air entering from the compressor and blown in the form of spray against the heated surfaces, by which it is vaporized, at the same time that the necessary volume of air is furnished to form the explosive mixture. In running at full power, the explosion and impulse occur at each turn of the crank shaft, the cutting out of an injection by the governor, and consequent omission of an explosion, constituting a method of governing by which the consumption of oil is proportioned to the actual power developed by the engine. It is estimated that with kerosene at seven cents per gallon, this engine may be run at an average cost of ¾ cent per horse power per hour. It is silent and smooth running, and the inclosure of the crank shaft, and the absence of all gears, cams and shafts, obviate danger to inexperienced attendants. The engine is free from the smell usually so objectionable a feature of oil engines, and all the working parts are protected from dirt and dust.

Weather News by Trolley Car.

The distribution of news by means of the now ubiquitous trolley cars has already been attempted in various ways, and chiefly in the line of advertising, outside the car as well as inside. In some cases, enterprising stores have mounted their notices on the trolley poles, like sails or pennants. The idea has also been successfully carried out by putting little flags or signs on cars when the circus is in town or when the ice will bear in the parks. In some places the cars in bad winter weather have carried signals notifying public school children as to whether school will be open or not. Of somewhat the same nature is the plan now being carried out on the Akron, Bedford and Cleveland suburban trolley line of displaying weather signals, says The Electrical Engineer. The plan is for the local weather bureau to notify the road of the successive and prospective meteorological changes, and for the cars as they go out to mount the appropriate signal in the shape of a tin flag symbol. Steam railroads have already tried this useful plan, and it is evident that the trolley cars can be even more efficient as distributers of such news quickly over large local areas. Cars running out into rural districts will be specially serviceable in this way.

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Home-made Fancy Cheese.

The extensive use of imported fancy cheeses in this country is partly offset by our exports of common American cream cheese. It is one of the strange facts of commerce that we send thousands of tons of cheese abroad to England, France, Germany and South America, and from these same countries import Limburger, Edam, Stilton, Roquefort, Brie, Camembert, Swiss and Neufchatel. We receive for our export cheese only nine to ten cents a pound, and pay our transatlantic cousins from thirty cents to one dollar a pound for their fancy dairy products.

In spite of our larger shipments, this difference in the price makes the balance of trade go against us, especially when we consider the comparative amount of raw material used in each. The milk and cream used for the foreign fancy cheeses are not superior to that raised in this country, in fact not so good; and it is not to be supposed that the Swiss or French dairymen can keep their cows cheaper than farmers can in this country, where sweet, succulent grass is as free as the air we breathe. The whole difference in the export trade in cheese is in the manufacture. With our natural impatience and desire to get quick returns for our labor, we seem unwilling to cure our cheeses properly, and we send common American cheese abroad for the poorer classes of Europe and South America, and receive the fancy cheeses of the foreign makers at a much higher price.

Until quite recently it was supposed that the fancy Swiss and French cheeses could be made only in the caves and peculiar climate of those countries; but experiments in this country have demonstrated that we can make these fancy products almost as well as the foreigners, and instead of paying half a dollar per pound for them, we can manufacture them at home for one-half. Nearly all of the desirable cheeses are made here now in a limited way, and we are beginning to make considerable headway in supplanting the foreign article by our own products. It requires time, patience and skill to make these fancy cheeses; but any one who is willing to pay this in exchange can have the desired results. In the present stage of the new industry it is possible that better success can be obtained in a small way where the fancy cheeses are made at home for table use. Any woman fond of these luxuries can manufacture a sufficient quantity at small cost to keep the table well supplied. The fancy cheeses can be made in the country or in the city, provided good milk and cream can be secured.

Roquefort cheese is one of the most popular of the foreign fancy cheeses, and it sells for half a dollar a pound in this country; but it is only a half-skim cheese that is easily made. The milk is first heated nearly to the boiling point, which destroys all undesirable germs in it, and then allowed to stand until the cream rises. In France part of this cream is then removed and made into butter, while the cheese is made of the remainder. Then the milk is heated again, and one tablespoonful of rennet is added to every one hundred and twenty pounds of milk. When part of the whey is drawn off, the cheese is sown with the needed germs. These are obtained by making a cake of barley meal and putting it away in a damp place until it is covered with a blue mould. When thick with these foreign germs, the cake is crumbled up and mixed with the curd as it is put into the moulds. The cheese is turned twice a day in the moulds, so that some of the whey is retained and not allowed to drip off. This whey is gradually absorbed by the cheese and with it some of the rennet. The cheese is kept in the mould in this way, protected from the air, for three days, and it is only opened occasionally for the purpose of turning it and sprinkling it with warm water. The warm water hastens the growth of the germs and ripens it. At the end of three days the Roquefort is exposed to a cool, dry air, preferably on the north side of the house. This cool atmosphere checks the growth of the barley-cake germs and dries out the moisture. The cheese may be wrapped in dry cloths to hasten the drying-out process.

In France the Roquefort cheese is removed to the limestone caves under the ancient town of Roquefort, where it is allowed to ripen and cure. Similar atmosphere to these caves can be provided in a cool, dry cellar. All light should be excluded, and a draught of cool air should be allowed to blow continually on the cheeses. The temperature must be kept as even as possible. While thus curing it should be sprinkled with salt frequently, and then when a gelatinous substance forms on the surface it should be scraped off with a knife. In time red, yellow and blue moulds will appear on the cheese. These must be scraped off in turn, and then the cheese is ready for eating.

English Stilton cheese is the most famous variety produced in England, and it is highly prized in this country as a fancy and luxurious relish. It somewhat resembles the Gorgonzola of Italy, the leading blue-moulded cheese of the world. The method of making the English Stilton is as follows: The morning's milk is set at a temperature of 85 degrees, and at the end of an hour the curd is removed in thin layers. The curd is placed into drainers prepared for this purpose, layer upon layer, and as it gets warmer it gradually parts with its whey. The corners of the cloth drainers are brought together and slight pressure is gradually placed upon the curd to make it part with its whey more effectually. The curd should be hung up in the drainers over night in a temperature of about 30 degrees. On the following morning it should be removed and cut up in small cubes and placed on tins to air. By coming in contact with the oxygen of the air the acidity of the curd is increased. On the second day the curd is ripe enough to mould. A similar curd is made from the milk and cream obtained fresh the second day, and these two are then mixed together in the mould. The mould is any vessel perforated with rather large holes through which the whey can drip. The first curd is distinctly acid, and when the two are broken up and mixed together they start germs to working that gives a peculiar flavor to the cheese. The cheese should be salted to suit the taste at this stage, and then the mixture should be moulded into the shape desired. In three or four days it will be firm enough to stand alone out of the mould if the temperature is kept at about 60 degrees. Then it is wrapped firmly in calico or cheese-cloth and put away to dry and ripen. The ripening process can be hastened by increasing the temperature of the drying room from 65 to 67 degrees. It may take several days or a week to make the cheese perfect, but all cheese cured in this manner improves with age if kept in the right temperature. This is one of the chief virtues of the fancy cheeses; they do not deteriorate with age, but rather increase in value up to a certain point. Ripening can be delayed and almost stopped by reducing the temperature, as the bacteria will not work and develop in a low temperature.

Gorgonzola cheese, of Italy, commands the love of every native of that sunny land, and it ranks high in most other countries. This famous blue-moulded cheese is made from the average milk of cows, and it is produced from two curds, similar to the English Stilton. In the case of the Gorgonzola, when the two curds are mixed together one is cold and the other warm and fresh. The milk of one day is brought to a temperature of 80 to 85 degrees and then the rennet is added. The rennet is put into a piece of cloth and then squeezed through it into the milk, where it is subsequently thoroughly stirred. When the curd is fit for breaking it is cut into very small pieces, and these are gathered up into a cloth and hung on a beam overnight for the whey to drip out. The temperature of the apartment should be kept between 60 and 65 degrees. The following morning the fresh milk from the cows is treated in the same way. The new curd thus formed will be warm, sweet and moist, while the curd of the previous day will be cold, dry and slightly acid. Any kind of a deep mould of wood or metal can be used. First a layer of the fresh, warm curd lines the bottom of the mould; then a layer of the previous day's curd is pressed over it, and so on alternately until the mould is full. The only thing to be sure of is that a layer of the fresh, warm curd covers the entire surface of the cheese. These two curds act and react upon each other.

In two days the surface of the cheese is then thoroughly salted with very fine salt. This salting continues daily from two to four weeks, the operator rubbing the salt in the sides thoroughly. If the blue mould does not then appear upon the cheese, it is pierced with metal skewers, which admit the air. In Italy the Gorgonzola cheese is taken to the caves to ripen, at this point; but nearly as good results can be obtained in a dark, cool cellar kept at a temperature of 55 degrees. It takes from four to five months for this cheese to ripen. During this time it will have in turn a dark fungus mould on its surface, a dull red and a blue mould.

Géromé, or Gérardmer, cheese is one of the best imported cheeses, selling in Europe as high as twenty-five cents a pound. It is made chiefly in the mountains of the Vosges, in eastern France, a part of the territory which was taken with Alsace from the French by the Germans. The fresh milk from the cows is drained as soon as obtained and at once curdled. Two tablespoonfuls of well-digested rennet are put into fifty quarts of milk. The milk is kept covered for half an hour after the rennet is added. Then the curd is ready for cutting to separate the whey. When the two have separated, the curd is dipped out and put into a wooden mould, made in two parts, one fitting into the other. The lower half is perforated with holes so the whey can drain off. In twelve hours the upper one is removed and a new one put in its place and the whole reversed. In this way the whey is completely drained and dried off. The temperature during this process should be maintained at 60 degrees. Then the surface of the cheese is salted every fourth day. The cheese is turned several times each day and dipped in water and wiped off with a dry cloth. When the cheese is dry enough so that the sweat no longer appears on its sides it is removed to the drying room. They are dried in open-air boxes with a cloth thrown over them to keep out the dust and flies. Then they are taken to dark, cool cellars, where they are cured in from three to four months. If the temperature is too cold for the ripening, the cheese must be washed in warm water occasionally, and if the temperature is too warm, it must be sprinkled with cold water. The whole curing process can be regulated in this way. A little over three quarts of milk make a pound of Géromé cheese.

G. E. W.

The Dangers of Acetylene Gas.

The board of Fire Commissioners of Jersey City has adopted regulations for the manufacture and storage of acetylene gas. The regulations provide: "That the manufacture of carbide of calcium or the liquefaction of calcium carbide be prohibited except under certain prescribed limitations to be designated by the board. That it declines to permit the use of any acetylene gas regenerator in this city except those devices first submitted to the board for careful test, examination, and approval of the board. That after the careful examination made into the methods of operation of the Bournonville gas regenerator, and finding the same to be operated on safe scientific principles, and in view of the small quantity of carbide treated by said device and the careful storage and distribution of the same, that the embargo laid by the board against the use of this machine be withdrawn and its operation sanctioned, provided that the methods now employed be not altered or made more dangerous.

"It is further provided that the use or storage of calcium carbide be confined to quantities of five pounds each, which must be stored in heavy block tin vessels, and until ready for use hermetically sealed, and that no dwelling, factory, or other building be permitted to keep on storage a total quantity in excess of twenty-five pounds in cans or vessels of five pounds each.

"All parties desirous of storing in this city a quantity of calcium carbide or liquefied acetylene gas in excess of the limitations above defined to be allowed to do so only upon formal request to the board and special permission obtained therefrom."

To Rebuild the Naval Academy.

Secretary Long has addressed a long communication to the Senate and House Committees on Naval Affairs, calling attention to the wretched condition of the Naval Academy and asking that an immediate appropriation of $500,000 be made and approval given to a general scheme which he submits for a complete rehabilitation of the school. This plan he submits was drawn by a special board, of which Admiral Matthews and Captain Cooper, superintendent at Annapolis, were members, and contemplates the expenditure of about $6,000,000. Secretary Long says that the essential features of this plan are approved by the department, but that as the finances of the country will not permit of a heavy outlay at once, he asks that provision be made now for three new buildings and other improvements, which can be carried out with a view to continuing the general scheme as money is appropriated.

The secretary asks that provision be made, says The New York Sun, without delay for an armory to cost $300,000, a boathouse to cost $300,000, a power house to cost $100,000, four rows of officers' quarters to cost $60,000, and for grading and electric plants $90,000.

A Locomotive Driving Wheel Bursts.

The rim of one of the big six foot driving wheels of the engine drawing the Royal Blue Line Express for Baltimore and Washington, which left Communipaw at 11:30, January 9, burst as the train was rushing past the Netherwood station at 12:10. The wheel went to pieces and the heavy sections of the rim flew in all directions. Three persons were injured somewhat. The train was making fully fifty-five miles an hour when the accident occurred. It ran more than a mile before it could be stopped, and brought up in front of the station in Plainfield, N. J. One of the sections of the burst driver flew outward and upward and cut a hole in the side of a coal car in a passing coal train. This brought the coal train to a stop and blocked the track the train was on for an hour. Another piece crashed against the side of the combination coach of the express train at the first seat back of the partition. A hole three feet square was torn in the side of the car.

International Fire Insurance Congress and Exposition.

An international fire insurance congress is being organized in Paris. Its president, says L'Argus, will be M. Berthelot, who believes it to be the duty of science to devise and disseminate effective means of forestalling or extinguishing conflagrations. The terrible disaster at the Bazar de la Charité has aroused the scientific world in France and elsewhere to action. Hence great scientific demonstrations may be expected. All inventors are invited to take part, and architects, engineers, builders, mechanics, etc., will vie with each other as regards enterprise and resources.

A special exposition to be held at the Esplanade des Invalides will precede the congress. The enterprise has gained many influential friends in the highest circles. The office is 5 Place de l'Opera, Paris.

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Science Notes.

M. Brunetière has retired from the editorship of the Revue des Deux Mondes, which will give satisfaction to scientific circles, as he changed the Revue from a liberal to a clerical organ and had adopted an attitude somewhat hostile to modern science.

The discoverers of quinine and strychnine, MM. Pelletier and Caventou, are to have a monument erected to them in Paris, and contributions are being solicited from pharmacists all over the world to aid in this worthy object. In this country the movement has been taken up by the Philadelphia College of Pharmacy, and Prof. Trimble, the editor of The American Journal of Pharmacy, has issued an appeal for funds in order that the United States may be worthily represented in the undertaking. Pharmacists who contribute to the fund will honor their vocation, says The American Druggist, while honoring the memory of two distinguished pharmacologists. The monument is to take the form of statues which will be erected in front of the High School of Pharmacy, in Paris.

The color of school exercise boards is a matter of great importance, but has been strangely neglected, says The Pharmaceutical Era. For, from time immemorial, it has been a fact of common knowledge, even among uneducated people, that black is the worst of colors for the eyes; hence, it has long been a custom with tailors to charge more for making a black suit of clothes than for any other color. For many years an exchange has given school room hygiene much special study, and taught that school exercise boards should not be black. The best color for such boards is some shade of cream white, a dead surface of soft, mellow tint, varied in its degree of whiteness to suit the quality and quantity of light afforded. The crayons for exercise boards, for ordinary daily use, should be a clear sky-blue color; the extra colors a canary orange and a clear dark green.

The remarkable property which some alloys of nickel and iron possess of having a coefficient of expansion nearly equal to zero suggested the desirability of employing these alloys for the construction of measuring instruments. With this object in view, M. Guillaume, in Comptes Rendus, has determined the densities and moduli of elasticity of a series of alloys of iron with 4 to 45 per cent of nickel. One curious result in the case of alloys with 25 per cent of nickel is that a rule made of this alloy and annealed at a given temperature continues to elongate when it is kept at a lower temperature. He also finds that an alloy containing 22 per cent of nickel expands when it is heated considerably more than ordinary steel, but an alloy of iron with 37 per cent of nickel hardly expands at all, so that the presence of an additional 15 per cent of nickel in nickel-iron alloys is sufficient to entirely change the nature of the metal.—Engineer.

According to a statement in the Revue Scientifique, the chemical adulteration of milk is one of the hygienic factors now to be dealt with. It seems that M. Denigès, of Bordeaux, having obtained possession of three samples of yellow powder used by certain milkmen of Bordeaux to preserve their milk, made a chemical analysis of it. This analysis showed that two of the powders were composed wholly of neutral chromate of potash, that the third was a mixture of one part bichromate of potash and two parts neutral chromate, and that the suspected milk had been adulterated with the last substance in the proportion of 0·30 gramme to the liter, say five grains to the quart. The alkaline chromates are, in fact, powerful antiseptics, capable, even in small quantities, of retarding lactic fermentation very noticeably, if not of stopping it entirely. But because of the deleterious action of these salts on the organism, the Revue calls emphatically for their complete exclusion from food substances, and particularly from milk, of which so many young children drink relatively large quantities.

The suspicion of important astronomical discoveries recently made at the Lowell Observatory, at Flagstaff, Ariz., which has prevailed among men of science for the last few months, was confirmed on November 29, says The New York Tribune. Briefly summarized, the work of the year at Flagstaff includes the discovery of about five hundred new stellar systems, the measuring of some seven hundred systems noticed by previous observers, the careful examination of five thousand stars in the zone between 20 and 65 degrees south declination all brighter than the tenth magnitude; the rotations of Jupiter's third and fourth satellites, resulting in valuable facts; an exhaustive generalization of the stars in space; an investigation, with excellent results, of the phenomenon known as the twinkling of the stars; a generalization of many double stars, etc. There arrived in Boston recently Dr. J. J. See, who is largely responsible for many of the discoveries in the heavens made at the Lowell Observatory. Dr. See has charge of the double-star observations; Mr. Lowell has charge of the planetary experimentations. Dr. See went to Boston with all of his records for the year. He went to consult with Mr. Lowell about the preparation and publication of these records.

Miscellaneous Notes and Receipts.

Distinction between Catechu and Gambier.—For distinguishing the dyestuffs obtained from Acacia catechu and Uncaria gambier, the author (K. Dieterich) recommends the following fluorescence test: Dissolve 3 grammes of gambier in 25 c. cm. of water. Then add 50 c. cm. of benzine (specific gravity 0·700) and pour the whole in a separatory funnel. After having been left to stand, the layers separate and it will be observed that the benzine shows a more or less intensive green fluorescence according to the duration of the action. Acacia catechu does not produce this reaction.—N. Pharm. Centralhalle.

Exhalation of Blue or Green Wall Paper.—The unpleasant exhalations of papered walls mostly emanate from such wall papers as have a blue or green ground, but also occur with such where the blue or green color constitutes the largest part of the pattern, the dyestuff being chiefly composed of blue or green ultramarine. The latter is perfectly harmless, but has the property of becoming decomposed by slightly sour liquids and to spread a most disagreeable odor of rotten eggs, i. e., to develop sulphureted hydrogen during the slow progress of decomposition. The paste used for fixing wall paper is frequently of a faintly sour or readily souring character, and quickly penetrates the paper, causing the above mentioned effect, as a very slight degree of fermentation suffices to bring about the said unpleasantness. The latter appears more markedly if the walls are slightly damp and already covered with several layers of paper, so that the lime plastering cannot have a neutralizing effect on the lactic acid in the paste, etc. In such cases, therefore, where it is necessary to affix wall paper upon a ground of old paper, as well as in all cases where green or blue wall paper is used, it is recommended to employ only such gluing agents as either do not sour or, if they are inclined to decomposition, contain slight quantities of lime, milk or soda solution, before use, thus excluding the occurrence of the said drawbacks.

Leather Varnish.—Caoutchouc 100, petroleum 100, carbon bisulphide 100, shellac 400, bone black 200, alcohol 2,000 parts. First the caoutchouc is brought together with carbon bisulphide in a well closed bottle and stood aside for a few days. As soon as the caoutchouc is soaked add the petroleum and the alcohol, then the finely powdered shellac, and heat to about 125° F. When the liquid appears pretty clear, which indicates the solution of all substances, the bone black is added by shaking thoroughly and the varnish is at once filled in bottles, which are well closed. This pouch composition excels in drying quickly and produces upon the leather a smooth, deep black coating, which possesses a certain elasticity.

A New Combustible.—In the island of Barbadoes large quantities of a mineral have been found which the natives call "manjak." It is of a bright black color and occurs at a very slight depth, sometimes on the surface in beds 1 to 2 feet thick; it generally appears under an angle of about 40 degrees and in the immediate vicinity of rock. It is presumed to be solidified petroleum, which is often seen there exuding from the earth or floating on the water. In its composition this mineral is similar to the pitch of Trinidad, to the gilsonite of Utah, and the Canadian albertite, but it is of a much better quality. The best varieties of "manjak" contained 2 per cent of water, 70·85 per cent of volatile organic substances, 26·97 per cent of ditto solid ones, and 0·18 per cent of mineral parts. A more general grade showed 5 per cent of water and mineral substance. Trinidad pitch contains 21 to 30 per cent of water and about 38 per cent of ashes; hence the "manjak" mineral is much richer in natural bitumen. It is used, among other purposes, for the insulation of electrical conduits, for varnish, bituminous concrete, and for fuel, mixed with peat, etc. It is expected that it will supplant gutta percha as an insulating medium. —Wallmann's Vers. Zeit.

Official Examination of Foods.—During the month of September, 1897, 202 samples of edibles and drinkables were chemically examined in Berlin, and 57 of them were rejected. Among the rejected articles were milk, butter, lard, flour, fresh eggs, sweet oil, lemon oil, chocolate, green tea, medicinal Hungarian wines, and denaturized alcohol. Remarkable was the large number of the butter samples which were found to be objectionable. Among 25 samples, 2 were pure margarine, 12 were mixed butter containing from 25 to 75 percentum of margarine and 2 samples were greatly suspected of an admixture of margarine. The milk control extended over 1,446 stores and led to the detection of 89 cases of adulteration, etc.; the butter control extended over 549 stores and 56 cases were detected.

Cracking Coal for Cutting Glass.—90 parts powdered charcoal, 2 parts saltpeter, 1 part gum benzoin and 2 parts tragacanth powder. Pulverize all finely, knead with water into dough, roll little rods from it, which are dried. Light these, pass slowly over the glass, and cause a drop of water to fall on it, whereupon the glass cracks off. To be used for cutting off glasses and bottles.

THE EDISON MAGNETIC CONCENTRATING WORKS.

Before describing the remarkable process of crushing and magnetic separation at Mr. Edison's concentrating works in the mountains of New Jersey, it will be well to speak of the elaborate system of prospecting which was carried out to determine the location of the various bodies of low grade iron ore which it is proposed to work by the new process. In iron mining, just as in gold mining, there is a limit to the grade or richness of ore which it is profitable to work in the existing state of the art. Hence the prospectors who for many years have worked over the Eastern iron ore districts have made no record of the existence of deposits which were not fairly rich in iron. As the Edison process was designed to render the hitherto neglected low grade ores commercially profitable, it was necessary to make a systematic prospect of the belt of magnetite deposits. The work was done by means of the dipping needle, and the survey was the most complete ever carried out. It embraced a strip of country twenty-five miles wide, reaching from the Canadian border to the mountains of North Carolina. Several corps of surveyors ran lines across the magnetite belt at intervals of a mile, and wherever the dip of the needle showed indications of ore, a more thorough search of the locality was made. The results were plotted on a map which is the most unique and thorough work of its kind in existence. When this was completed, the company proceeded to purchase or lease the most desirable properties, their holdings at present amounting to some 16,000 acres.

The New Jersey and Pennsylvania Concentrating Works are located on the site of the old Ogden mines, one of those many abandoned iron mines of New Jersey from which the veins of richer ore have been worked out during the century or more in which iron mining has been carried on in this district. The body of ore averages about 200 yards in width, and extends for a distance of over two miles. The average richness of the ore is about 20 per cent of iron. It should be mentioned that although the works at Edison witnessed the first attempt to carry out magnetic concentration on a commercial scale, Mr. Edison had conducted a series of preliminary experiments at Llewellyn Park, N. J. The operations at Edison commenced about six years ago, and the characteristic energy and lavish expenditure with which they have been carried on have resulted in the present enormous and extremely interesting plant.

The visitor to Edison who is familiar with the scope of Mr. Edison's inventive genius—and who is not?—in the design and perfecting of such delicate or complicated devices as the incandescent lamp, the phonograph or the vitascope, will find that in the totally different fields of mining and milling, with their massive machinery and vast operations, Mr. Edison has shown a characteristic originality and freedom from the trammels of tradition. This is evident, not merely in the application of an entirely new system of concentration, but in the preliminary work of mining and crushing, where, surely, most men would have been content to follow the beaten track.

To carry out the process of magnetic separation called for the design of an entirely new plant in itself, and involved long years of patient and costly experiment; and, with a view of cheapening the work of getting out the rock and crushing it to the desired fineness for the magnets, an entirely new method of quarrying and crushing was devised and put in successful operation.

The works are situated approximately midway of the length of the deposit. A system of tracks runs from the crusher house to two powerful steam shovels which are working their way into the ore bed in two different directions. One of these weighs 60 tons and the other—a magnificent fellow weighing 93 tons—is the biggest of its kind ever built. In getting out the rock ready for the crushers, no attempt is made to shatter it to the usual size of say 100-pound lumps by the free use of dynamite. The latter is used merely to loosen up the rock sufficiently for the great shovel to tear it loose and load it on the cars. Consequently it is frequently dug out of the cut in solid masses weighing as much as 5 and even 6 tons apiece and sent to the rolls in this shape. A double track, with a switch at the far end, runs through the cut on a slight up grade. The empties are pushed up and allowed to run back, by gravity, past the shovel, where the rock is deposited on 5-ton skips, of which there are two to each car. The tracks run on each side of the crusher house, and here the skips are picked up by a pair of 10-ton electric traveling cranes and placed on an inclined table in front of the hopper above the "giant rolls." At the foot of this table is a revolving cylinder controlled by the operator, over which the material is fed to the rolls. This arrangement is clearly shown in our front page engraving, where a load is shown falling from the skip into the rolls.

The giant rolls are what might be called the spectacular feature of the whole plant, and to see them seize a 5-ton rock and crunch it with less show of effort than a dog in crunching a bone gives one a vivid sense of the meaning of momentum—for it is momentum that

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