stood that the invention, according to the manufacturers' statement, doubles the capacity of the drum cylinder machine, without detracting from the finished quality of the presswork.

The first of these machines is now in successful operation in one of Frank Leslie's pressrooms in this city. Messrs. Cottrell and Babcock's office is at No. 8 Spruce street, New York.

Correspondence.

Life-Saving Apparatus.

To the Editor of the Scientific American:

I am pleased to see the illustration of Mr. J. B. Rogers' life-saving apparatus in your issue of September 25. At this time, when so much is being attempted by the United States government and so much is done by foreign powers, in perfecting the means of communicating with stranded vessels, any new devices, so well illustrated, command respect. It is to be hoped that at our grand Centennial Exposition there will be ample space allotted and ample means provided for practical experiments with all known devices for rescuing shipwrecked persons.

Allow me to quote (from a pamphlet published by me in 1872) some of the results of experiments in casting lines by projectiles: "The Manby mortar was fully illustrated in a pamphlet published in 1826, and was for some time the popular means for getting communication with a wreck. Its weight, with its bed, was about 3 cwt., and it carried a line of 1½ inches 200 yards, by a 24 lbs. shot, and a deep sea line 270 yards against a strong wind. I give a quotation of value from Mauby's pamphlet. "It is of the first importance for a lifeboat to resemble as much as possible those which the beach men are accustomed to and have confidence in, not only because it is necessary to humor the prejudices of such men, but whatever tends to increase their confidence must increase the chance of saving life." Whatever may be said of Manby's antiquated notions, the above advice is sound. The Boxer accelerating rocket has entirely superseded the Manby mortar in England. The effect is that, when the first charge is expended, when the rocket has attained a certain elevation or range, a second charge is fired. The line used is made of Italian hemp, 500 yards length and weighing 46 lbs. After getting the line on board a vessel, other, larger lines are hauled off, and finally a hawser is set up, and communication is established by means similar to those in your illustration. The principal objections to the general use of the Boxer rocket by the United States stations, and by humane societies, lies in the fact that it is costly, and that the inventor has given the right to use it into the hands of parties who naturally desire to profit by its sale. Could we have the privilege of manufacturing it in our laboratories, the cause of humanity would be greatly advanced.

I have been informed that the German government has in use a rocket which has a range of 800 yards, which is nearly double the range of the Boxer rocket. It has also another advantage over it by reason of the staff being attached in a direct line with the body of the rocket, which insures more accurate aim, the staff of the Boxer being attached to the side of the rocket. Measures should be taken to make rockets of our own, and if possible beat our transatlantic humanitarians.

In a report by Commander Jerningham, when Comptroller of the Coast Guard, he says: "The experiment at Woolwich gives the following results: Manby mortar, caliber 5½ inches, elevation 33°, charge 10 ounces. The mean distance carried in 20 rounds was:

In fine weather, 6 thread Russia line, 245 yards. In fine weather, Manilla line, same size 285, yards. In moderate weather, with fresh breeze, hemp line, 237 yards. In moderate weather, with fresh breeze, Manilla line, 279 yards. In strong gale, squally, elevation 28°, hemp line, 211 yards. In strong gale, squally, elevation 28°, Manilla line, 243 yards.

A strong wind requires less elevation than a moderate wind. A cross wind reduces the range more than a head wind. The quality and amount of powder is of much importance. A Manilla line, laid up slack, will stand 16 ounces when 12 will break a hemp line; 120 fathoms of Manilla weighs 11 lbs. against 15½ lbs. of Russian. Lines properly balled, after the manner of spun yarn, were found less liable to foul and more portable than lines carried on racks in boxes. Manilla rope beckets attached to the shot are best; one shot was fired 27 times with the same becket. Manilla line will absorb less water and be liable to less injury from being put away wet than hemp."

For want of space I cannot more fully quote this paper of Jerningham's. He alluded to firing off a block and double line when the wreck is near enough, in the same manner as Rogers does. He also speaks of an anchor shot that he had fired, in moderate weather 210 yards, in a gale 150.

In 1870 my attention was called to Rogers' apparatus. A report of trials made by the Admiralty states, in brief, as follaws: "His anchor weighing 134 lbs., with a block and line making 200, was thrown 134 yards from an 8 inch mortar with 12 ounces powder. In another experiment the anchor was thrown from a common howitzer."

And again Captain Boys, of the Excellent training ship, fired an anchor weighing 128 lbs., with a block and line of 1 inch, 156 yards with 8 ounces powder, once 152 yards, once 163 yards, and in the fourth shot, with 12 ounces, 217 yards. Experiments were made with Rogers' anchor at Liverpool, throwing a 1 inch line 200 yards, and a smaller one 400; but in this last case, the line broke. In November, 1870, the Royal Naval Reserve Club resolved that "this meeting strongly recommended its adoption by the Royal National Lifeboat Institution." The Royal National Lifeboat Institution, through its executive agent Captain Ward, R. N., expressed the opinion in a letter to me that Rogers' apparatus would not take the place of the Boxer rocket, as he thought the anchor shot would be likely to attach itself to the wrong place; at the same time he said that Rogers had succeeded in throwing his anchor much farther than he expected. Notwithstanding the opinion of Captain Ward, I hope that the Rogers apparatus may be utilized in this country, where we have no Boxer rockets. If adopted, it may be made useful in throwing an anchor off shore to facilitate the launching of lifeboats. In cases like that of the Italian bark Giovanni, lost on Cape Cod, with all her crew save one, last March, the distance being 400 or 500 yards, the mortar of the government failed to carry a line far enough. In a case like this, the new German rocket would be very useful.

The cost of the Boxer rocket apparatus, as I learn from I. and A. W. Burt, London, is $625, which includes 24 rockets and sticks, 20 lights, 20 portfires, primers, lines, boxes, whip, hawser, tally boards, blocks, slings, triangle, 2 Ward belts, life lines, flags, tubes, fuzes, diagrams, and packing. Formerly Dennet's rockets were used by our society, but they were found to deteriorate by the necessary exposure on sea beaches; and they sometimes burst prematurely, so that our society has long ago discontinued their use.

The French use a different method from the English. Their lines are thrown by means of what they call *flèches* or arrows; more properly, they should be called clubs or sticks of wood, as well as of iron, which are thrown from various pieces of ordnance. The wooden ones have the advantage of floating sometimes within reach of the wreck.

A full detail of these means was given in a pamphlet published by me in 1872, to which I refer. Could we exercise as much ingenuity in devising means for saving life as we do for killing, many lives might be saved.

Boston, Mass. R. B. FORBES,

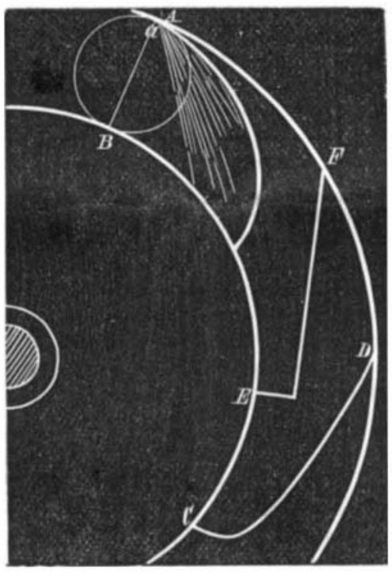
Chairman of Standing Committee of the Massachusetts Humane Society.

Water Wheel Buckets.

To the Editor of the Scientific American:

I give you a rule for the construction of the buckets of overshot water wheels, which I have never seen in print:

Make the inner face of the buckets in the form of an epicycloid, generated by a circle (whose diameter, *a* B, see diagram, equals the depth, A B, of the rim of the wheel, *minus* the thickness, *a* A, of the buckets) revolved upon the circle, B E C, which forms the back of the buckets. Then the outer corner, A, will be flush with the rim. As may be seen by rotating the diagram, this form of bucket retains its water better than either of the forms, C D and E F, in common use, but does not carry any too far, that is past, the lowest point of the wheel.



TOWNSEND WOLCOTT.

New York city.

American Inventions in Europe.

To the Editor of the Scientific American:

One characteristic of American exhibits, in the world's fairs held in Europe, is that they do not consist of products so much as the agents for producing. Our tools, machines, and inventions are exposed before the world in a manner that conduces much to our credit as ingenious and persevering, but with a corresponding loss to our material interests, as any one who has examined the matter carefully must know. I am fully convinced that not one in a thousand among our implement makers knows to what extent and with what success our American products become models in Europe, and it is to call some attention to the matter that this is written.

Every circumstance in our country tends to promote this exposure of our tools and processes. Our isolated position from the rest of the manufacturing world, and the prohibition of imported tools by a high tariff, prevents a knowledge of what is done by others; and while we rely solely on our own resources in devising machines and processes, other countries not only employ their own skill, but draw on us for all that is of use to them. Our skill is the base of any success we have had or can hope for, in creating a foreign market for American manufactured products. This every one knows; and yet we throw open our workshops to the inspection of every one, with a recklessness which is astonishing to people in Europe; and we seem to have no secrets worth preserving. A German, Swede, Pole, Russian, or other foreigner has, as a rule, only to present a card at the doors of our workshops to be admitted and have every process pointed out and explained. This is not so in other countries, especially in those from which we can hope to draw useful suggestions as to commercial policy.

Without ignoring in any way the influence for good which may come from the reputation gained by exhibiting our handicraft, I would beg our engineers and manufacturers to consider that such influence is a weak one compared to price when it is desired to influence a buyer. The money cost of a product is the only sure base upon which a market for it can be made; and while foreign orders may be, as they now and then are, secured, such orders will not be repeated unless we produce the article at less cost than it can be copied for in Europe. I repeat that our only power and hope of a foreign market, now so much needed, lies in two things: skill in producing superior to, and labor more effective than, those of Europe. Our boundless natural resources may be balanced against three or four thousand miles of sea carriage, if we only keep our processes to ourselves, and show finished products instead. To go to America to learn to manipulate processes in working iron and wood is becoming part of the education of young mechanics and engineers from North Europe. I could at this time give names of many who are making, or have made, this kind of tour through our workshops. Hundreds, yes thousands, come to America to become skilled, and then return home to astonish their friends with what has been learned, and to reap the result in higher wages, which for a time will be paid for their services.

I may be asked: How is this to be prevented? The answer is simple enough. Shut up the shops, admit no one not supplied with proper reference, and not then, if the object is to acquire special information. This is done in England, thoroughly and completely, and nearly as well on the continent. Why cannot it be done in America? It may be said that our tools and machines must be shown in order to sell them, and that they must be exhibited next year at Philadelphia. This is true; but there is a wide difference between showing completed tools, implements, and machines, and in exhibiting the mode and processes of constructing them. Suppose the Waltham Watch Company, who have just occupied their magnificent new premises in London, were to send over some of the Clerkenwell manufacturers' skilled men to examine the operations at Waltham, and then furnish to these men a set of machines and tools like those in use at Waltham. How long would the business of exporting watches last? Yet this is what is continually done in many branches of our manufactures. Those operations of manufacture which do not find their way into our scientific journals—little things, not scientific and seemingly unimportant—very often determine the cost of products, in a way to secure or lose sales abroad. "It is the last cent that tells," and this last cent is generally taken off by some simple little expedient which, for a stranger to see, is for him to have and for us to lose.

These things would soon be understood and appreciated if our implement makers would visit certain parts of Europe which I could point out, and see the copies of our machines and tools exhibited as "improvements on the American,' and hear (to explain the assumption) how "Americans are cunning and inventive, but without the power to apply their knowledge, because not educated," and so on. Something of this is done in England and France, but not much. These countries are not small enough and petty enough to tolerate such things; beside, we are too well known to be charged with incapacity.

A word of caution in this way will not be out of place for the coming year. Thousands in Europe are waiting for a raid on our workshops; and while nothing should be done to detract from the character of the Exposition in Philadelphia, you will excuse me for suggesting that the influence of your widespread journal could not be better used than in giving stronger expression to the present subject than is possible at the hands of OBSERVER.

Electric Force and Molecular Motion.

To the Editor of the Scientific American:

Mr. W. E. Sawyer, in his letter on "What is the Electric Force?" in your issue of October 9, says: "When one pulls a bell cord, and instantaneously a bell is rung in a distant room by the molecular transmission over or through the bell wire of the force applied at the cord, does not one realize that he is as veritably, as wonderfully, and by a similar molecular motion, transmitting that signal as though he were transmitting it by applying a battery to a telegraph wire, and thus setting the atomic particles in motion?"

I propounded the above question to myself, endeavored to realize it, and failed signally; therefore I apply to you for help, and trust it will be given, for Mr. Sawyer's explanations of the electric force seem so clear and forcible as to enable almost any one to form a good idea of the subject.

When one pulls a bell rope, causing a bell to ring at a distant point, one can readily realize the disturbance of the atomic particles from ocular demonstration. He sees the movement of the cord where the force is applied, and also where the bell lever receives it, and the only rational explanation is that of molecular transmission.

In the case of the telegraph, he sees no motion, either where the force is applied, or where it is taken off, even when the force so applied is very powerful. However, this may be deduced by reasoning, as Mr. Sawyer so ably shows, but the real difficulty is at the end, where it is utilized. The wire terminates in a coil, and inside of this coil, entirely separated from it, is a bar of metal, and entirely separated from this is the bell lever. Now it is difficult to conceive how the mere molecular disturbance of the wire causes a like disturbance in the bar, which again causes the same in the bell

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lever or armature. If the motion were transmitted directly to the bell lever by a material connection, as in the first case, then there would be no difficulty in understanding this application of the theory.

Philadelphia, Pa. THOMAS C. MARCKLEY.

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An Amateur Chemist's Narrow Escape.

To the Editor of the Scientific American:

I am, by accident, the discoverer of a most wonderful explosive; I say that I am the discoverer of it, for the simple reason that, so far as I can ascertain, it has not heretofore known. If I am wrong, I desire to be corrected. Of the nature of the explosive and the cause of its explosion, I am unable to speak; but from its composition, I should say that it was related to nitroglycerin; and its effective power confirms the idea, as, although its force was not nearly so powerful as that of nitroglycerin, it exercised it in much the same manner. I shall, most likely, and perhaps not without cause, be denounced as fool hardy, and be advised to let alone that of which I know nothing. But be this as it may, the following are the facts in regard to the composition of the compound, and the *modus operandi* of its discovery:

I had been experimenting on the absorptive powers of turpentine, and among the other substances employed was nitric acid; I found, after the acid had been in contact with the turpentine some twenty-four hours, that they had both undergone a material change in their nature; they had assumed an entirely different color, the acid being reddish, the turpentine yellow, and a third substance (between them) of an exceedingly red color, and their properties seemed to be changed in other respects. I thought this change might have been caused by some impurities in the acid, which was commercial; so I determined to repeat the experiment and use chemically pure acid. To carry out my plans, I procured a common eight ounce, glass-stoppered bottle, and poured into it two ounces of acid and the same quantity of turpentine. They both remained perfectly clear and colorless, and showed, on account of the great difference in their specific gravities, a decided division line. I then placed the stopper in the bottle and shook it, then let the liquid subside, and noted that the turpentine retained its colorless condition, but the acid was of a reddish tint; I once more shook it, and, when the contents had returned to rest, the turpentine was of a yellow color, the nitric acid a fiery red; the division line between them was almost lost. I then shook it a third time, and noted that the whole quantity was blood red; I had but just placed it on a table to allow the contents to settle when it commenced to effervesce; I picked it up, tried to pull the stopper, found I could not, and turned to a window distant some two feet; the window was up, but the shutters were closed. I made a motion to open the shutters, when there was a terrific report; the hand in which I held the bottle was empty, my face covered with acid, and the room completely filled with gas and vapor.

I left the room immediately, and applied water and milk to my face to stop the biting of the acid, and then returned to the scene of disaster. The floor was covered with glass almost in a state of powder. In a piece of walnut furniture, distant from the point of explosion fifteen feet, I found glass in pieces the size of shot, completely imbedded in the wood; the carpet, directly under where I had held the bottle, was torn in sundry places, and the glass buried in the floor. The bottle was demolished in the strictest sense of the word, being reduced to pieces from the size of corn grains down to wheat, and even finer. The stopper of the bottle I have not been able to find, and I suppose it was demolished also. The way in which I escaped was miraculous; the hand in which I held the bottle was not so much as scratched. I think the bottle must have passed from my hand before it exploded; but if it did, its passage and explosion were so instantaneous, that it seemed to burst in my hand.

I enclose for your inspection a sample of the remains of the bottle.

Monticello, Pa. E. G. ACHESON.

[We are sorry to be compelled to dash the hopes of our correspondent by saying that his discovery is not new in many of our college laboratories.

The experiment above described is one usually performed before a class beginning the study of chemistry, in order to demonstrate the power with which nitric acid oxidizes bodies capable of undergoing oxidation, like phosphorus, sulphur, carbon, and the hydrocarbons. Turpentine also is generally the hydrocarbon selected, as being nearest at hand. It is also frequently repeated by tyros with effects presenting a striking similarity to those graphically depicted in this thrilling narrative, but young students seldom venture upon more than a few drops of the mixture. There is certainly a great novelty in beginning to experiment upon four ounces of so unstable a body as nitric acid, and so volatile and inflammable an oil as turpentine. We make a publication of the results in this case, in the hope that it may be of service in preventing accident, if not loss of life, to other amateur experimenters. Our correspondent certainly had a narrow escape —EDS.]

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Steam Boiler Phenomena.

To the Editor of the Scientific American:

In the account of steam boiler phenomena on page 193 of your current volume, the temperature of the feed water is not given in either case. This is an important item in considering cases of this kind.

If in the first case, the feed water were very hot, it would require but little more heat to convert it into steam. This heat being supplied from the overheated boiler, the pressure would go up until the temperature of the iron was reduced to that of the feed water.

In the second case, if the feed water were cold, it would sooner absorb the heat of the boiler. It would then condense the steam and produce a partial vacuum, as stated.

The action would be similar in the two cases, the pressure going up to a point corresponding to the amount and temperature of the feed water and the heat contained in the iron of the boiler, and then falling, as I have no doubt it would have done in the first case if the pumping had been continued.

Perry, Ill. L. D. KENNEDY.

◆

American Grape Vines in France.

To the Editor of the Scientific American:

In regard to an article in your valuable paper of September 11, headed "American Grape Vines in France," I would respectfully call your attention to a letter which appeared some time ago in the *Gironde*, of the Canton of Bourg, contributed by M. Marchal (a justice of peace). He attributes the plagues of the grape vines, known as oidium and phylloxera, not the introduction of parasites from America, but to a diseased condition of the vines, caused by old age and general exhaustion, of which the parasites, which attack the roots, take advantage. As the vines are multiplied from the old plants by cuttings, he considers that there is no renewal, but only a propagation or continuance of its former life and age. If, therefore, the cuttings from old vines are planted, it is not a recreation of a new plant, but simply a continuance of the life of the older plant from which the cutting was transferred. The age, therefore, of a vine in general reaches to the time when it was first planted from the seed, consequently he advises growers, under these circumstances, to plant new vines raised only from the seeds.

May not the success of the American vines, being younger and more vigorous, and transplanted to different soil and to a different climate, be attributed to this law of Nature? To many, undoubtedly, this view will appear rational; and it certainly deserves a fair trial, not only in France but also in other countries, wherever the plant, that produces the golden or ruby fluid which makes the heart glad, flourishes.

Kissingen, Bavaria. JOHN EITEL.

Black Oxide of Manganese for Destroying Noxious Gases.

Don Julius de Valmagini, of Vienna, claims to have discovered a new and valuable disinfectant in the ordinary black oxide of manganese. In the *Bayerisches Industrie and Gewerbeblatt*, he writes as follows:

"It is well known that ozone is the only substance which will rapidly decompose badly smelling gases; but up to this time we possess no method of preparing ozone cheaply and in large quantities. I have found by a series of experiments that ozone is present in black oxide of manganese (*Braunstein*) in large quantities, and that it is continually regenerated. It was not hitherto known that many kinds of oxide of manganese (manganite, pyrolusite, etc.) were ozone carriers; but I can prove that they not only possess all the properties of the known ozone bearers, but are excellently adapted to use in all cases where ozone has proved useful.

(*a*) Ozone test paper, prepared with starch and iodide of potassium, is immediately blued by the liberation of iodine without any acid being added.

(*b*) A solution of chemically pure iodide of potassium is at once decomposed by dropping into it a fragment or some of the pulverized mineral, the liberated iodine turning the solution brown. The liberated iodine is recognized by all its reactions, such as turning blue with starch paste, dissolving in chloroform or bisulphide of carbon, subliming at the boiling temperature, and the characteristic odor.

(*c*) Chemically pure binoxide of manganese, prepared artificially, shows the same reaction in chemically pure iodide of potassium as given above at *b*, reacting just like the natural product.

(*d*) When the pulverized mineral is strewn upon chemically pure silver and moistened, the silver is browned at once by the formation of oxide of silver; on heating, the brown spot entirely disappears, proving that it was not sulphide of silver which was formed.

(*e*) The air is also ozonized by contact with the surface of the mineral or of the powder.

(*f*) The reaction about to be mentioned now was indeed known, but was never considered as an ozone reaction, namely: Tincture of guaiacum is colored deep blue by the oxide of manganese.

(*g*) Black oxide of manganese is also well adapted, by its ozonizing power, to destroy putrid gases, such as sulphuretted hydrogen, and putrefactive gases, and that too in a very short time.

From this it may be concluded that many kinds of manganese ores could meet with extensive use for sanitary and building purposes."

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The Soda Lakes of Wyoming Territory.

Professor Pontez, Geologist to the Union Pacific Railroad, reports as follows on an interesting deposit of carbonate of soda in Wyoming Territory:

"The carbonate of soda deposit is, by nearest road for wagon, sixty-five miles from Rawlins Station, nearly due north. There are two lakes. The upper and larger one covers about 200 acres; the water has an average depth of three feet and a specific gravity of 1·097; it therefore contains nearly one pound of soda to ten of water. The soda is nearly all carbonate. The second lake is situated about two miles east of the large lake, on a somewhat lower level. It is bowl-shaped, and covers rather more than three and one half acres. During the greater portion of the year, it is a concrete mass of crystals of carbonate of soda, mixed with a small quantity of dust blown from the adjacent plain. I excavated to the depth of six feet, but did not reach the bottom of the deposit. Its entire depth can only be ascertained by boring. It is a reservoir or pocket which receives its increase from the periodic influx from the larger lake. The water, having no outlet, evaporates during the summer, and by autumn becomes a compact mass.

The quality of the carbonate is fully equal to the imported article used throughout the country. Its minimum or bottom price has been $15 per tun, up to $67, its present price. Estimating the quantity by the specific gravity of the water, its depth and area, the large lake covering 200 acres will yield on evaporation 78,000 tuns, which, at the market value, would realize, at $45 per tun, $4,510,000. Besides the cost of freight, the expense of preparing the article for market would be $4 per tun, for evaporating.

The small lake already crystalized, and estimated only to the depth of six feet and an area of 155,000 feet, contains 30,660 tons, which, at $45 per tun, would realize $1,379,700, with no drawback except freight and commission.

The reason why this valuable deposit of a staple article has not already been drawn on largely is the difficulty and expense of hauling it 55 miles. A range of mountains called the Seminole intervenes between the deposits and the Union Pacific Railroad."

◆

The Practical Determination of Coal Tar Colors.

The colors fabricated from coal tar are commercially known by such a variety of names that it has become quite difficult for consumers to recognize the nature of the bodies employed by them. The following information, communicated to the *Muster Zeitung* by H. Goldschmidt, will serve as a practical guide in determining the principal dyes, etc. now produced.

The red coal tar colors most frequently met with in commerce are fuchsin, saffranin, and red corallin. These three are easily distinguished by their action in the presence of an acid, which will color an aqueous solution of fuchsin, yellow; of saffranin, violet blue; and with corallin, will give an orange yellow precipitate. The violet coloring matters are the violets of phenyl, of iodine, and of methyl. The first two are but partially soluble in alcohol and in water. To distinguish them, a certain quantity of the specimen is dissolved in alcohol, and ammonia is added. If the solution becomes red, phenyl violet is recognized; if colorless, then one of the other two. To determine which one, dissolve another portion of the specimen in water and add ammonia: violet of iodine gives a clear liquid; violet of methyl gives a colorless but troubled liquid.

Coal tar blues are aniline and alkali blues. The last is always soluble in water. Aniline blue present two modifications, of which one is soluble in water and the other in alcohol. The two blues are easily distinguishable from the fact that aniline blue always gives a blue solution; while that of alkali blue is colorless until an acid is added.

The green aniline colors most commonly found are aldehyde green and green of iodine, simple or with picric acid. Determine first whether the body is soluble in water; if so, then it is iodine green. If not easily soluble, dissolve it in alcohol, and add cyanide of potassium. If the liquid then becomes colorless, the body is aldehyde green; if it turns brown, picric acid iodine green is present.

The commonest yellow colors are picric acid and its salts and naphthaline, all soluble in water. Dissolve, add cyanide of potassium, and heat; if the liquor becomes reddish brown, picric acid or a picrate is present; but if the color simply darkens, a little napthaline is denoted. In the first case, to determine between picric acid and a picrate, treat with benzine and heat; picric acid, alone, dissolves.

The orange hues are yellow corallin, the salts of chrisanilin and of chrysotoluidin, Victoria orange and a mixture of naphthalin and fuchsin known as aniline orange. Add ammonia; if it dissolves, giving a red liquor, corallin or a chrisanilin combination is present. To distinguish which, dissolve a little of the sample in alcohol, add zinc and diluted sulphuric acid: if the liquor becomes colorless, corallin is denoted. If ammonia, as above, does not color the solution, dissolve in water and treat with acid: if there be any change, chrysotoluidin is recognized; but if a precipitate is formed, it is a sign that the substance is either Victoria or aniline orange. To distinguish which of the two, add to the aqueous solution cyanide of potassium; if the liquor turns brown on heating, Victoria orange is present; if the color changes but very slightly, aniline orange.

The browns are those of aniline, maroon, grenat, and two species of phenyl brown, one made with carbonic acid, the other with phenylendiamine. Determine, first, whether the substance is soluble in water. If not, add hydrochloric acid; and if a yellow color is produced, maroon is present. If the acid occasions no change, add to a portion of the solution some ammonia; if there be a precipitate, the substance is anilin brown or phenylendiamine brown; if the ammonia is without action, it is grenat (isopurpurate of potassium). Phenyl brown and anilin brown are distinguishable from the fact that the last yields a precipitate when cyanide of potassium is added to it, while phenyl brown similarly treated undergoes no change.

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IN preparing lard for the market, it should first be cut into pieces about the size of a walnut, and these should be allowed to stand in water for half an hour. Then work the material with the hands in 5 or 6 successive portions of water. Next pour off the water, melt the lard in a water bath, and strain through fine linen. In the first straining, it will be impossible to get rid of all the water; so that after cooling and draining, it will be necessary to remelt the lard and finally to filter it through paper in a warm closet.

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