SALT-CAKE IN DYEING.

Written for the Scientific American by DR. M. REIMANN.

In England, as well as in Germany, salt-cake, or sulphate of soda, has been employed for some considerable time already as an expedient in dyeing wool.

The practical dyer, when asked concerning the advantages of this substance, which seems to possess so little importance, for the dyeing process, can state no reasonable ground for its employment, only in rare cases you will perhaps hear that the bath dyes more equally when sulphate of soda is added to it. Even the chemist, on regarding the matter somewhat superficially, does not observe what purpose the sulphate of soda serves in the dyer's bath. He considers it one of the number of utterly useless substances employed by the dyers in accordance with the prescriptions of some hand-book.

Nevertheless, if we regard the matter carefully in the following discussion, we shall see that sulphate of soda can be of the very greatest value in dyeing processes, and that its employment is based on the most interesting chemical and physical principles. At the same time we shall be obliged to advance into the comparatively unknown region of the dyeing theory, the practical use of which we shall soon recognize.

The sulphate of soda, which is scarcely ever treated of in books on dyeing, because of its chemical indifference for coloring matters, elevates, as every soluble substance does, the specific weight, and thus also the boiling point of the solution. This property already, when taken into consideration, renders it important for many dyeing processes. It is possible, for instance, to change the shade of aniline violet into blue or red, according as the temperature of the solution is more or less elevated.

When the dyeing is performed in an acid bath (the dyers very frequently add sulphuric acid to their baths), the sulphate of soda combines with the free sulphuric acid in the bath, and forms with it bisulphate of soda, a crystallizable solid salt. In this manner the bath retains its acid reaction without the presence of free sulphuric acid in the bath. Hence, when half-woolen cloths are dyed, the cotton in them, extremely sensitive to the action of the mineral acids, will be very well preserved.

Dissolved in water in great quantities, the sulphate of soda diminishes the capacity of the bath to dissolve the added coloring matters in as great a degree as though there were no such salt present; this, too, is highly important for many dyeing processes.

Several practical examples will demonstrate the advantages of sulphate of soda more conclusively than a whole series of theoretical observations. The red coloring matters as the cudbear, and more especially the magenta, and the red dyeing woods, possess, as is well known, the property of combining only with the greatest difficulty with the fiber when dyed in an acid bath. Therefore, wherever the substances are employed in the acid bath—and often this is necessary—the greatest part of the coloring matter is wasted and lost if the common process is employed. The same applies also to the yellow wood.

If, however, the said coloring matters be dyed in an acid bath according to this new method, a twofold result will be attained. By adding sulphuric acid, the dyeing power of the said pigments can be put into activity, and by varying the quantity of sulphate of soda which is employed, it is possible to control the combination of the pigment with the texible fiber. Therefore, by means of the sulphate of soda various shades can be produced.

This fact is of great importance in many sorts of dyeing. There are some kinds of yarn, especially the long *slubbing* wool, which have the property of felting when exposed too frequently to a change of temperature; they can then no longer be worked into weft yarn. Nevertheless, the wool must be exposed to such a change of temperature, for, in preparing the shades, it is taken out of the bath at times, so that new coloring matter may be added to the part already in the bath.

In all these cases it would be unnecessary to take out the yarn if we were to add a little more coloring matter and acid, and shades could be produced by gradually adding sulphate of soda to the bath. By this process a great deal of manual labor may be spared, and the dyer enabled to work with far more security and comfort. Should at any time too much coloring matter have gone upon the fiber, the fault can readily be corrected by the addition of a little acid.

The truth of the above assertions is most easily perceptible in dyeing Magenta. As another example, let us regard the dying of shades, for which the wool must first be boiled in a solution of a chrome salt, in the most cases in bichromate of potash. This is often done for red, brown, and gray, which are produced by means of logwood, red and yellow wood. When the wood is boiled in a bath of bichromate of potash, and especially when to this, as is commonly the practice, sulphuric acid is added, the colors of the logwood and red wood attack the fiber very quickly, and therefore often spread unequally. Hence, dyers must begin to dye at low temperatures, and must increase the heat very slowly. If to such a dyeing bath but a small quantity of acid is added, the effect of the coloring matters in it is almost nothing, it is, therefore, possible to dye with the boiling bath without fear of an unequal spreading of the coloring matters. It is only necessary to add, while the coloring matter is fixing on the fiber, sulphate of soda in small quantities, the coloring matter will combine with the fiber, while the sulphate of soda absorbs the free acid. It is therefore possible to produce shades without removing the goods from the bath, if we take care that the quantity of coloring matter which is at first added to the bath is not too small.

A similar effect can be produced by adding the sulphate of soda at the beginning of the dyeing process. For sulphate of soda we may, in this case, employ even common salt. In this case the salts employed will, when dissolved in the fluid, precipitate the dissolved coloring matter, which is then contained in the bath, in a very fine state of division, or the salts will prevent the coloring matters from dissolving, according as these latter or the salts were first introduced into the bath.

For the process this is quite indifferent. The pigments fix on the fiber in the same measure as they are dissolved. Fresh coloring matter will only then be dissolved, when the portion already in dissolution is already consumed. The dyeing is more equal, if the coloring matters are not dissolved in the bath, but are contained in it in a state of minute division, as every dyer knows who has ever employed aniline blue, soluble in water. This pigment, because of its ready solubility in acids, often fixes too quickly if the dyeing is carried on in an acid bath, and therefore dyes at times unequally. It is therefore best to dye from a neutral or weak alkaline fluid, and then to produce the blue by adding an acid. The same pigment soluble only in alcohol is precipitated as soon as its solution is added to the bath, and therefore dyed more equally, though more slowly still. In many cases also it is advantageous to employ sulphate of soda where small quantities of indigo carmine are used to give somewhat more of blue to a shade. The affinity of this coloring matter for wool being very great, small quantities of it may often dye the woolen goods very unequally; to prevent this, and give uniformity to the color, it is necessary to continue the boiling operation for some time. The indigo carmine will dye more slowly and equally in the case of the free acid is carried off by sulphate of soda.

The question now remains whether only the sulphate of soda, the importance of which I have endeavored to prove in the preceding remarks, is able to produce these results, or whether any other agent, can replace it in these processes.

In the preceding I already mentioned common salt as a substitute; and it can be advantageously employed, if either a higher specific weight can be produced, or the dissolved coloring matter be precipitated.

When common salt is employed in an acid bath, the development of hydrochloric acid is highly disagreeable. Cotton is violently attacked by it. Common salt can in turn be replaced for these processes by sulphate of magnesia and other salts which exercise no effect on the chemical constituents of the coloring matters, as, for instance, the compounds of alumina, iron, and tin.

Similar to the effect produced by the sulphate of soda, is that of the corresponding combination with potash, viz.: the sulphate of potash. This salt, however, is more expensive than the soda-salt. The bisulphate of potash is now already frequently employed in dyeing. The bisulphate of soda, which is a residium in some chemical manufacturing processes, for instance, in the production of nitric acid can often be advantageously employed for sulphate of soda and free acid.

To compare the expense of the employment of these substances, we must therefore observe that the sulphate of potash crystallizes without water, while the sulphate of soda contains 55·9 per cent, and the sulphate of magnesia 51·22 per cent of water, which is of course devoid of any value.

Finally, we must state that 100 parts of crystallized sulphate of soda are able to fix 30½ parts of sulphuric acid (of 668 B. s. w), and thus to form bisulphate of soda; or, in other words, for every pound of sulphuric acid added to the bath, three pounds of crystals of sulphate of soda must be employed.

MANGANESE---ITS USEFUL APPLICATIONS IN THE ARTS.

BY DR. L. FEUCHTWANGER.

This mineral substance was known in ancient times under the name of "glassmaker's soap" and was considered a species of iron ore. In the year 1740 it was ascertained to be an oxide of a separate metal, and in 1774, Gahn obtained the pure metal from the native carbonate, exposing the same to intense heat for several hours, or by subjecting chloride of manganese to electrolysis. Boerhaave does not appear to have known the metal. In my English edition of 1753 he speaks of it in the following words: "Take the frit and set it in melting pots in a working furnace, adding in each pot a proper quantity of a blackish stone not unlike loadstone, and called manganese, which serves to purge off that greenish cast natural to all glass and to make it clear." Scheele, Bergman, Chevreul, Berthier, and Berzelius, have in modern times investigated the physical and chemical characters of manganese. The ore is widely distributed over our globe; it accompanies many iron ores, particularly the hematites, also the franklinite of New Jersey. It has been detected as a constituent of meteoric iron in the ashes of most vegetable and many animal substances, is the coloring principle of many fossils in a dendirtic form in the chalcedony which is called the "mocha stone," and in the same form on sand pebbles of which I found plenty in Stanislaus River in California. It also occurs combined with sulphur, carbonic acid, silica, water, and with many atomic proportions of oxygen, such as protoxide, sesquioxide, binoxide, manganic acid, and permanganic acid becoming thereby sometimes a base and sometimes an acid. The principal varieties of manganese found in nature are of the following descriptions:

1st. Hausmannite has the form of a four-sided pyramidal crystal, with hardness 5, and a specific gravity 4·7.

2d. Braunite is an anhydrous sesquioxide, crystallizes in an octahedron, is much harder than the last, and has a higher specific gravity.

3d. Psilomelane, generally called the compact gray oxide, occurs in botryoidal and stalactitic shapes.

4th. Manganite is a hydrous sesquioxide; crystallizes in right rhombic prisms.

5th. Pyrolusite, the most useful and abundant ore of manganese, derives its name from two Greek words signifying "fire" and "to wash", in allusion to its property of discharging the brown and green tints of glass; it crystallizes in small rectangular prisms, or is fibrous, radiated, and divergent, of iron black color and grayish streak, has a specific gravity of 4·94, and is composed of 37 per cent oxygen and 63 per cent manganese. This ore is generally called binoxide, deutoxide, or peroxide, is a good conductor of electricity, and strongly electro-negative in the voltaic circuit. When heated to redness it readily parts with its excess of oxygen as it gives off one third of it. When heated with sulphuric acid one half of its oxygen escapes. Owing to this property it is more employed in the arts than any other oxide; it is called in trade the "black oxide of manganese." Its commercial value is dependant upon the proportion of oxygen which it contains in excess of that which is necessary to its existence as sesquioxide. A convenient method of estimating this excess of oxygen is founded upon the circumstance, that the black oxide of manganese is decomposed in the presence of oxalic acid, and from sulphuric acid proto-sulphate of manganese is formed, and all the excess of oxygen reacts upon the oxalic acid and converts it into carbonic acid which passes off with effervescence. If the mixture be weighed before the decomposition has been effected, and again after it has been completed, the loss will indicate the amount of carbonic acid; each equivalent of peroxide of manganese gives two equivalents or its own weight of carbonic acid.

Manganic acid is known under the name of chameleon mineral, is obtained artificially by fusing the peroxide of manganese with equal weights of caustic potash, which when dissolved in a small quantity of water has a green color, but when largely diluted becomes purple and ultimately claret color; for this property it has been employed for many years in the arts.

Permanganic acid is artificially obtained by mixing intimately four parts of finely powdered peroxide of manganese with three and one half parts of chlorate of potash, while five parts of hydrate of potash are dissolved in a small quantity of water and added to the above mixture, the whole is evaporated and reduced to powder, then heated to dull redness for an hour in an earthen crucible and when cold the mass is treated with water and filtered through a funnel plugged with asbestos; the solution after being neutralized with sulphuric acid yields on evaporation beautiful red acicular crystals of permanganate of potash. This preparation of later years has become an important vehicle for disinfection. Among the other native oxides of manganese may be mentioned the *mineral wad* which is also very abundant but not valuable enough to produce gas. It is amorphous, soft, black, or brown and purple; when mixed with linseed oil it produces spontaneous combustion. It is supposed to be the coloring ingredient of the dendritic delineations upon many substances, such a steatite and others mentioned elsewhere. The localities of manganese are very prolific; pyrolusite has been mined very extensively in Europe; psilomelan in England, France, Belgium, and the United States; manganite in Bohemia, Saxony, and England. Much of the latter is consumed in the bleacheries of those countries. The United States and the Provinces have inexhaustible deposits of the oxides of manganese. From Vermont, the eastern limit, to Georgia, the southern limit, large supplies were formerly furnished, but in late years West Virginia, North Carolina, and California have supplied us to a large extent but not of a high grade of oxidation. While the binoxide of manganese suitable for the manufactures ought to yield from 80 to 90 per cent of oxygen gas, the product of the last mentioned States has not exceeded 50 to 70 per cent oxygen. The provinces of New Brunswick and Nova Scotia have produced within a few years very superior oxides of manganese, and the specimens I possess in my cabinet excel in richness and beauty those from Ilmuran in Thuringen and Ihlefeld in the Hartz mountains of days gone by. The manufacturers of bleaching powders in England have for the last twenty years been supplied by the little principality of Nassau to the amount of fifty thousand tuns per annum, while the United States with all its inexhaustible resources has not exported any, and it is hoped that before long the export of manganese may prove lucrative. The quality of the Nova Scotia manganese is, according to Howe, of high per centage, some from 82·4 to 89·8 of sesquioxide, and that from Tennycape as high as 97·04. The international manganese mine of New Brunswick contains from 80 to 85 per cent of sesquioxide. We find manganese in the State of Missouri containing much cobalt, while the Vermont manganese is associated with much iron. We also find in California, in the red hill of the bay facing the city of San Francisco, containing millions of tuns of psilomelane or compact manganese yielding from 40 to 50 per cent sesquioxide. We also know manganese to be abundant in Canada. A vein of 50 to 60 feet wide is said to exist at Bachawanning Bay on Lake Superior.

The geological position of manganese is not quite accurately known. In Germany it traverses porphyry and is associated with calcspar and baryta. In Vermont, in the United States, it is found among crystalline rocks; in Canada it is accompanied by dolomite, and in Nova Scotia it exists in a gray limestone, quartzite, and conglomerite, and it unquestionably belongs to the new red sandstone formation. My manganese mines at Pembroke are situated close to the gypsum deposits, which would range them with the upper silurian system.

I will now enumerate the many useful applications in the arts.

1st. Manganese is employed for producing oxygen gas in the chemical laboratory, the material of the compound blow pipe and drummond light, for the production of alkaline manganate in order to procure a good and cheap light in combination with coal gas.

2d. Manganese is most extensively used in the manufacture of chlorine so as to prepare a bleaching liquid or powder, the consumption of which by the paper and cotton manufacturers is unlimited.

3d. Next in importance is the manganese largely employed in the green flint glass works in precipitating the iron, and when added in excess to produce an amythyst color in flint glass.

4th. Steel manufacturers require manganese for producing a hard and tough product; a half pound to fifty of iron will have the effect.

5th. Linseed oil is rendered more siccative by the addition of manganese, and is called a patent dryer for paints and varnishes.

6th. A permanent black on earthenware and pottery is obtained by exposure to heat.

7th. A black enamel used in ornaments by jewelers is likewise produced with manganese.

8th. The manufacture of permanganates, a powerful disinfectant, and the main material in the new oxygen light is obtained from the same.

9th. The quality of spirits, with or without distillation, is obtained by the use of maganese.

10th. The chameleon mineral used in sugar refining is prepared with manganese.

The consumption of manganese for the manufacture of the new gas light about to be introduced in this country, forms a new epoch in this direction. It is to be converted first into the alkaline manganate, which acting as a sponge alternately absorbing the oxygen of the air and again releasing it, must require if successful, not less than one hundred thousand tuns of manganese in order to produce a million of cubic feet of oxygen gas, and I gather the following particulars from the programme issued by the inventors, Messrs. Tessie de Motay and Marechal of Metz: "The manganates are decomposed at a temperature of 600 deg. Fah., by the action of a jet of ordinary steam which liberates the oxygen and leaves a residuum composed of sesquioxide of manganese and the alkaline base contained in the combination. The manganate is regenerated by submitting the above mentioned solid residue to the action of a current of air at the same temperature as used in the decomposition, and all these operations are conducted in a series of retorts placed in a furnace where the manganates, after being raised to a temperature of 600 deg. Fah., are alternately submitted to the action of a jet of steam and current of air which restores to the mass the oxygen has lost. The oxygen is disengaged by the steam from retorts; this steam is liquified by pressing into a condenser, and the pure oxide is collected into a gasometer. When applied for the production of light, oxygen in combination with common coal gas permits a reduction in the consumption of the latter, but at the same time giving an equal quantity of light in the proportion of 16 to 1.

The permanganate of potash or Condy's disinfectant is recommended as a powerful agent in obtaining pure drinking water and in epidemic diseases. But by far the largest amount of manganese is consumed by the manufacturer of bleaching powders. England alone consumes 80,000 tuns for that purpose per annum, and as soon as the United States becomes independent of the English imported chloride of lime for bleaching the cottons and the papers, not less than one half million tuns will be consumed for the desired object, for on examining the report of the director of the bureau of statistics, I find that 12,682 tuns of bleaching powder have been imported the first five months of the year at the value of $324,066.

NOTES ON THE VELOCIPEDE.

Our exchanges teem with items of all sorts concerning the velocipede. We are also in receipt of many letters of inquiry and suggestion with reference to the construction of the machine, some of them unpractical, others containing useful hints. One correspondent suggests the making of a vulcanized rubber rim to velocipede wheels, so that they could be run over Belgian pavements without shock to the rider, and the propeller wheel could also gain superior tractive power. Some very ingenious and peculiar devices are now on their way through the Patent Office, and will, if successful, make this little iron horse "a horse of another color," if we mistake not in our predictions.

A lady, writing from Georgia, wishes manufacturers to take into special consideration the wants of ladies. She says that the awkward position they are now forced to assume astride the front wheel, is a serious objection. She suggests a velocipede for two persons. It might have seats something like a side-saddle facing in opposite directions and be propelled by the combined power of the two riders, each on her own side of the wheel. This suggestion is worthy consideration, but, for our own part, we don't think it would work well with two female riders. There can be no doubt, however, that good sport could be had by a gentlemen and lady on a machine of such construction.

As is the case with almost every new invention, there are those who wish to make out that it is a discarded experiment of the past; but we do not believe the velocipede of the past could compare either in principle or nicety of construction with the two-wheeled machine of the present.

We have in our office a colored engraving of the velocipede of 1819, described in an English journal as follows:

This machine was of the most simple kind supported by two light wheels running on the same line; the front wheel turning on a pivot which, by means of a short lever, gave the direction in turning to one side or the other, the hind wheel always running in one direction. The rider mounted it and seated himself in a saddle conveniently fixed on the back of the horse (if allowed to be called so), and placed in the middle between the wheels; the feet were placed flat on the ground, so that in the first step to give the machine motion the heel should be the part of the foot to touch the ground, and so on with the other foot alternately, as if walking on the heels, observing always to begin the movement very gently. In the front before the rider was placed a cushion to rest the arms on while the hands held the lever which gave direction to the machine, as also to balance it if inclining to either side when the opposite arm was pressed on the cushion.

It will be seen at once that the "little difference" in the manner of propelling this machine and the modern one, completely changes the character of the vehicle. The ridicule which assailed this machine was not without foundation; the motion in propelling it was not graceful, and it was said to give rise to numerous cases of rupture.

Not so with the velocipede of the present, which glides along as though it were alive, and with a smooth grace alike exhilarating and beautiful to behold.

An English paper gives a description of a velocipede calculated to convey from six to a dozen people. It has four wheels for carrying and propulsion, and a fifth guide wheel, which acts upon a lever or pole, and cramps two of the wheels precisely as the fore wheels of carriages are now cramped in turning. Each pair of carrying wheels is provided with double cranks which are connected with each other by longitudinal treadle bars, so that all can aid in propelling the machine. This velocipede is provided with cross seats having backs like one of our Yankee market-wagons. It has not been tried yet, but it is stated that a club is being organized to manipulate it.

Performances with them are coming into fashion at the theaters. In the Parisian theatrical world considerable sensation has been caused by velocipede performances, and even some curious acrobatic exercises are gone through with them. A notice in the Paris journals recently stated that not more than twelve velocipedes should be allowed "at one time" on the stage. Chicago has followed suit, and the habitues of Crosby's Opera House have been treated to velocipede exhibitions between the other portions of the entertainment.

There also was a velocipede race at Pike's Music Hall in Cincinnati recently. A silver cup worth $100 was given to the fastest rider, and another, also worth $100 to the slowest rider

An exchange says, that a day or two since, a certain gentleman in Chicago, who has been practicing for some time on the side walks, at vespertinal hours, came out upon Indiana avenue, and throwing down the gauntlet of defiance, dared a street car driver to race with him to Thirty-first street, the terminus of the track. The challenge was gallantly accepted by the car driver, although the latter had several lady passengers on board. The race began auspiciously, the horses being driven at a furious pace. The velocipede soon gained upon its competitor and bade fair to distance it when an unlucky crack in the sidewalk received the fore wheel, leaving the other, in obedience to the law of its momentum, to turn a somersault, throwing the rider into the gutter. The car won the race on a "foul."

Rural districts are catching the mania. A velocipede school has, we learn, been established in Bridgeport, Ct., but it is said that the nearest approach to a velocipede that has been seen in Danbury was a bit of orange peel, on which a citizen went across a sidewalk and down a pair of stairs in just 1¼ seconds—the quickest time on record.

Winslow Homer's last drawing for *Harper's Weekly* is very original in conception. He makes the New Year come in on a velocipede!

Mr. Dana, of the *Sun*, has become, it is said, one of the most expert velocipedists in the city. It is also asserted that he advocates a project to build an elevated railway from Harlem to the Battery, to be used only by the riders of velocipedes. By this means it would be possible to go from one end of Manhattan Island to the other in about an hour, making allowance for delays from stoppage and accidents. A good rider, with a clear track, would easily accomplish the distance in half an hour; but, with a well-filled road, progress would necessarily be slower. The proposed roadway ought to be at least thirty feet wide, upon an iron framework; with a flooring of hard pine. By all means let us have the "elevated roadway," and let the sidewalks be kept clear for pedestrians, who are otherwise likely to be endangered by the carelessness or awkwardness of velocipedists.

We regret to record that the Park Commissioners have prohibited velocipedes in the Park. The reason assigned is that the drives are narrow and horses are likely to become frightened. Then, why, Messrs. Commissioners, do you not widen the drives without delay? The Park was made for the public not the public for the Park. The drives are too narrow, anyway, especially on the east side of the Reservoir, and as we believe it is intended to widen them, we do not see good cause for postponing the work. As to frightening horses the following, from a correspondent of the *Herald*, is practical and suggestive:

The *Herald* is right. Velocipedes ought to be admitted to the Park. And why not? In the year 1855 I spent nearly four months in Paris, and occasionally saw velocipedes passing rapidly through the Champs Elysees and along the boulevards without exciting much attention either from man or beast. The horses did not appear to notice them at all. I was in Paris again last spring and found the velocipede mania raging with considerable force, and these vehicles were commonly to be seen upon the most frequented streets and public places of the city. The horses were not afraid of them. Yet, if you will allow me to say so, I am not quite sure that this state of things would hold good in our parks. It is noticed by all travelers that a runaway is a rare occurrence in Paris. Indeed, this remark holds good respecting all other cities in Europe. I have spent nearly two years of my life in Europe, and in all that time I never saw a horse run away. On my first visit to the Park after my return, in June last, I saw the fragments of no less than three light geared, heavy top buggies scattered along the roadway, and it is not uncommon, I am told, to have ten or fifteen injured persons brought in on a single day to St. Luke's Hospital, victims of smash-ups in the Park.

There is something radically wrong either in our driving or in our system of breaking horses. Probably both are faulty. And here, I suggest, is a subject for a searching inquiry.

Adulterations in Tea and Coffee.

The New York *World* has been applying its editorial nose to the tea chests and coffee bags, as well as the whisky barrels of New York, and finds much to offend. It says:

We heard, not long ago of one of the great tea houses buying in a cargo of damaged tea from a vessel which sunk in the harbor. It was properly doctored and fixed up, and put into the market afterwards. A common adulterant of genuine teas is exhausted tea leaves. A few years ago there were eight manufactories for the purpose of re-drying exhausted tea leaves in London, and several others in various parts of the country. The practice pursued was as follows: Persons were employed to buy up the exhausted leaves at hotels, coffee houses and other places at 2 1-2d. to 3d. per pound. These were taken to the factories, mixed with a solution of gum, and redried. After this the dried leaves, if for black tea, were mixed with rose pink and blacklead, to "face" them, as it is termed by the trade. The same practice is pursued in this country.

Perhaps the most general mode of adulterating the better grades of coffee in New York is by the admixture of inferior coffee. The Java is, of course, rich and comparatively expensive. The common South American coffee is cheap, has a flat aroma, and a bitter taste. When the berry is burnt it cannot be readily distinguished from the Java berry, and, of course, identification is lost after grinding takes place. We are informed that a new adulterant has been discovered in sweet potatoes, and that it is becoming quite popular with the sellers of ground coffee. It has the right color and taste, and it is not easily detected without the microscope. The common adulterant for coffee, however, is chicory. The use of chicory is openly acknowledged in some places, and even defended by grocers on the score of health and economy.

We have medical testimony that chicory is extremely injurious to health. Dr. Hassall says that taken constantly, prolonged and frequent use produces heartburn, cramp in the stomach, loss of appetite, acidity in the mouth, constipation with intermittent diarrhea, weakness in the limbs, trembling, sleeplessness, a drunken cloudiness of the senses, etc. Again, it is the opinion of an eminent oculist in Vienna, Professor Beer, that the continual use of chicory seriously affects the nervous system, and gives rise to blindness from *amaurosis*. Its use ought, therefore, to be discouraged, and grocers who sell it for coffee ought doubly to be put under the ban.

An Earthquake Convention.

A convention called by joint committee, on the Investigation of Earthquakes, has heen held in San Francisco, with a view to the adoption of an improved system of building and other precautions against future disaster from earthquakes. The following report of its proceedings is from the *Bulletin*:

Mr. Gordon explained that the laboring oar in the investigation must fall on the two secretaries, and gentlemen had been selected having peculiar qualifications for the position, and who could give their entire time to the business in hand. Professor Rowlandson would bring the experience and critical knowledge of a man of science, and Mr. Bridge, a practical architect and builder, a vast fund of information in relation to investigations and experiments with mortars, cements, etc., gained while with General Gilmore, United States army.

The President called for reports from the sub-committee No. 1, on bricks, stone, and timber.

General Alexander, chairman, reported that the committee had made some preliminary investigations as to the qualities of brick, and had put on foot inquiries as to the properties of brick made mostly from sand, which had been highly spoken of in the Eastern States. He had no hesitation in saying that, as a rule, the brick used in the city were not good. Better brick can be made with the same material by using proper proportions and knowledge in burning, etc. He cited from his own experience a case in point, where a large kiln of brick had been condemned as defective, and from the same material, under his supervision, a very superior article had been made; the difference being in proportions and in burning.

Sub-committee No. 2. on Limes, Cements, Mortars, etc., Colonel Mendel, chairman, reported that they had the matter in progress, but were not prepared to make any extended report. Granted further time.

Sub-committee No. 3, on Structural Designs, General Alexander, chairman, reported progress from the committee, who were granted further time.

The President made some incidental remarks on the advisability of recommending some plan by which structures already erected can be strengthened by iron bracing, to resist any subsequent shocks, instancing the plan he was adopting in bracing the sugar refinery, etc. The matter was discussed by General Alexander, Colonel von Schmidt, Dr. Blake, and Judge Rix. On motion of Mr. Rix the matter was referred to the Committee on Structural Designs.

Sub-committee No. 4, on Scientific Inquiry, etc., Dr. James Blake, chairman, reported that the committee had met, and the investigations had been commenced. In this connection a letter was read by General Alexander from R. C. Hopkins, Custodian of the Spanish Archives in the Surveyor-General's office, stating that the archives were at the disposition of the committee in any investigation they might wish to make, and offering his services as translator, etc. The matter was referred to the same committee.

A discussion followed on the value of these old records on the subject under consideration. From remarks made by Prof. Rowlandson, it appeared that the old Mission records had been pretty well searched by Dr. Trask, Dr. Tuthill, and others. Mr. Hittell, of the *Alta*, stated that he had personally inspected these old manuscripts, with this very object in view, and found them very meager and unsatisfactory. On motion of Major Elliot, Colonel Williamson, United States Engineer, was placed on the Committee on Scientific Inquiry.

A letter was received from W. Frank Stewart of San Jose, accepting the invitation to serve on this committee. On motion, the gathering of facts connected with the earthquake in the vicinity of San Jose, was intrusted to Mr. Stewart.

FOOD REQUIRED TO SUSTAIN LIFE.—Judging from the minimum quantities of food upon which an ordinary individual is capable of existing without suffering in health, it would seem that about 4,100 grains of carbon and 190 grains of nitrogen are required in his daily diet. These proportions have been determined from a large number of observations, as by those of Dr. Lyon Playfair, in his inquiries into the dietarics of hospitals, prisons, and workhouses, and by those of Dr. Edward Smith, in his examination of the amounts of food upon which the Lancashire operatives were capable of living during the cotton famine, and also by his inquiries into the dietaries of indoor laborers.