The prieſt in the meantime, with arms extended, and eyes turned towards heaven, muttering ſomething in a low tone of voice, when the man who had carried the ladder fell on his knees, and nine times proſtrated his body to the ground, according to the cuſtom of the Chineſe. Several women and children remained at a diſtance, as if forbidden to approach too near; though as prieſteſſes are ſaid to be common in this country, it is not probable there was any reſtriction on account of the ſex." The Cochin-Chineſe are extremely ſuperſtitious, and their devotional exerciſes, like thoſe of the Chineſe, are more frequently performed with a view of averting an ideal evil, than with the hope of acquiring a poſitive good; or, in other words, the evil ſpirit is more dreaded than the good one is revered. In various parts of the country are erected large wooden pillars, not only for the purpoſe of marking the ſpot where ſome great calamity may have happened, but as a propitiation to the evil ſpirit, by whoſe influence it is ſuppoſed to have been occaſioned. So, when an infant dies, the parents are ſuppoſed to have incurred the diſpleaſure of ſome malignant ſpirit, which they endeavour to appeaſe by offerings that they imagine to be moſt acceptable to the angry divinity. Beſides the ſpontaneous offering, which individuals conceive it neceſſary to make on various occaſions, there is a yearly contribution levied by government, for the purpoſe of ſupporting a number of monaſteries, in which the prieſts invoke the deity for the public welfare. This contribution conſiſts of produce in kind, as rice, fruits, ſugar, &c.; in lieu of which, in towns, are collected money, metals, and clothing. The prieſts here, as in China, are reckoned the beſt phyſicians, but their art lies more in charms and facinations, than in the judicious application of ſanative drugs.

COCHINEAL, *Coccus cacti*, Linn. See Coccus *Cacti*. The ſubſtance known in commerce by the name of cochineal, which is the moſt precious of all our dyeing drugs, affording the ſcarlet crimſon, and many other valuable dyes, and from which the fineſt carmine is generally prepared, is in the form of hemiſpherical ſhrivelled grains, about an eighth of an inch long, of a deep reddiſh-purple colour, and covered more or leſs with a white down: they are very light, and eaſily rubbed to powder between the fingers. The Spaniſh merchants diſtinguiſh at leaſt two kinds, the beſt, or domeſticated, called *grana fina*, or fine grain, and the wild, or *grana ſylveſtra*; of theſe, the latter is not more than half the ſize of the former, and is covered with a much longer down; on which account it always bears a much lower price in the market.

The cochineal inſect is a native of Mexico, and was in common uſe among the inhabitants as a dyeing drug when the Spaniards firſt came into the country; ſince that period its uſe has become more and more general, not only in Europe, but in various parts of Aſia, and, as almoſt the whole of this valuable commodity is ſtill raiſed in Mexico, Peru, and the adjoining Spaniſh ſettlements, it becomes every year an object of more ſedulous cultivation than before.

The beſt and fineſt cochineal, and, indeed, by far the greateſt proportion of that conſumed in Europe, is brought to us from Mexico. The principal diſtricts where it is bred are Oaxaca, Tlaſcala, Chulula, Neuva Gallicia, and Chiapa, in New Spain, but it is in Oaxaca that the greateſt quantities are produced, where the cultivation of this little inſect has long given employment and been an object of commerce to the native Mexicans. According to Ulloa it is likewiſe produced at Hambatia, Loja, and Tucuman in Peru. It has been introduced into St. Domingo, and the Braſils alſo.

The wild cochineal (grana ſylveſtra) feeds upon moſt of the ſpecies of cacti that are natives of Mexico, requires no particular care or attendance, and may be gathered ſix times in

in the year, there being ſo many generations of this inſect in a twelvemonth: the time of collecting the cochineal is juſt before the female produces its young, as the animal periſhes immediately afterwards. The cultivated cochineal (grana fina), called alſo *Meſtique* from a Mexican province of that name, is the product of ſlow and progreſſive improvement in the breed of the wild cochineal, and is found only in the gardens and plantations of Mexico, where, provided with its choiceſt food and ſheltered from the inclemencies of the ſeaſons, it attains nearly double its original ſize. This feeds only on one ſpecies of cactus, the cochenilifer or nopal, and produces only three broods in the year. Its management is ſimple, but requires inceſſant attention. At the third annual gathering of cochineal, a certain number of females are left adhering to branches of the nopal, which are then broken off and kept carefully under cover during the rainy ſeaſon; when this is over, the ſtock of cochineal, thus preſerved by each cultivator, is diſtributed over the whole plantation of nopals, where they ſoon multiply with great rapidity. In the ſpace of two months, the firſt crop is gathered by detaching the inſects with a blunt knife, after which they are put into bags, and dipped in hot water to kill them, and finally dried in the ſun, by which they loſe about two-thirds of their weight. This kind is alſo much more abundant in colouring matter, in which, indeed, its ſuperiority over all other kinds conſiſts; ſince, from the experiments of the French academicians, the grana ſylveſtra of Mexico, and the cochineal of St. Domingo, afforded colours equal in brilliancy, though not in quantity, to the meſtique or grana fina. The cochineal of Braſil alſo, according to Bancroft, is not inferior in quality to the fine grain of Mexico, though it contains only half the quantity of colouring matter. The proportion of colouring matter contained in equal portions of the cultivated cochineal, of the wild cochineal of Mexico, and of an inferior kind from St. Domingo, is, according to Berthollet, as eighteen, eleven, and eight.

In time of peace, the cochineal of Mexico is almoſt excluſively ſent from Vera Cruz to Cadiz, whence it is diffuſed all over Europe; but in time of war a contraband trade is carried on to various parts of America and the Weſt Indies, whence this country is chiefly ſupplied.

The quantities of fine cochineal imported into Spain in the years 1788, 1789, and 1790, amounted to 11,000 bags, weighing 200 lb. each, and making together 2,200,000 lb. weight; and between the 1ſt of January, 1791, and the 1ſt of October in the ſame year, the importations had exceeded 2000 bags. From accurate calculations it appears that the average quantity of fine cochineal, annually conſumed in Europe, amounts to about 3000 bags, or 600,000 lb. weight, of which 1200 bags, or 240,000 lb. may be conſidered as the preſent annual conſumption of Great Britain: a greater quantity comes, indeed, into the kingdom, but the ſurplus is again exported to other countries. The attention of the Eaſt India company has been lately directed to the production of this inſect, though hitherto with but partial ſucceſs. It is very ſmall, not very abundant in colouring matter, and inferior in quality to that of New Spain. It is uſed only for the coarſeſt goods, and ſold from 3*s.* 6*d.* to 5*s.* per pound. From 8 to 10,000 lb. are annually brought to this country. See Coccus Cacti.

Cochineal retains ſome traces of its original form, even in its dried ſtate; and though Europe for a long time conſidered it as the ſeeds of an Indian plant, it is eaſy to ſelect from a parcel ſome inſects in which the round or convex back, with ſmall tranſverſal furrows and flat belly, are readily diſcovered. Its external or commercial characters differ conſiderably; it is diſtinguiſhed by the dealers chiefly by its colour and ſize. 1. The large black, or deep purple, of bright hue, is preferred to all others. Its value decreaſes with its ſize and luſtre. 2. The large ſilver grey, though held in leſs eſtimation here, is, in general, equal to the former. It is preferred by the German buyers, to whom it is ſold ſomewhat lower than the preceding, and from which it differs only in the leſs removal of that white farinaceous powder with which the inſects, in their natural ſtate, are covered. 3. The ſmall white or ſilvery cochineal is held in little eſtimation, and ſold at very inferior prices. Cochineal duſt is ſometimes found in the market, and alſo the ſmall, or mutilated grains, ſeparated by the ſieve from the larger, and known by the name of *Granilla*. All theſe kinds are liable to adulteration with various ſubſtances, but more eſpecially with a paſte, which is ſometimes managed ſo dexterouſly as to deceive the beſt judges, without very particular examination.

The uſe of cochineal was known to the Mexicans before the invaſion of the Spaniards. It was the beauty of its colour, as diſplayed in their furniture, ornaments, and cotton cloth, which firſt directed the attention of their conquerors towards this precious inſect. From the reports made to the Spaniſh miniſtry on this ſubject, orders were iſſued to Cortes, in the year 1523, to take meaſures for multiplying this valuable commodity, and conſiderable quantities, raiſed by the induſtry of the natives, were ſoon afterwards ſent to Spain. Although it was for ſome time ſuppoſed to be the berry or ſeed of a vegetable; it was at length, however, aſcertained that theſe grains were the females of a particular ſpecies of inſect, called by naturaliſts "Coccus cacti," and of the ſame genus as the "kermes" (Coccus ilicis, Linn.). See Coccus.

It is probable that alum was the only mordant uſed for fixing the cochineal dye for ſome time after its introduction into Europe. The Mexicans alſo employed the ſame ſubſtance, as appears from the teſtimony of the Spaniſh hiſtorian, Herrara. The colour afforded by cochineal with the aluminous mordants is crimſon, and, indeed, previous to the diſcovery of the uſe of tin, this ſeems to have been the only colour analogous to ſcarlet that was known. Drebbel, or, as ſome ſay, Kuſter, or Keffler, a German chemiſt, firſt diſcovered the effect of the ſolution of tin in exalting the cochineal dye. He brought his ſecret to London about the year 1643; and the firſt eſtabliſhment for dyeing ſcarlet in this country appears to have been at Bow, whence it obtained, for a long time, the name of the Bow-dye. The proceſs was known in Holland ſoon after the diſcovery was made, and in France alſo, where it was practiſed by the famous Gobelins, who received information from a Flemiſh painter, to whom it had been communicated by Kuſter himſelf. For the details of this operation, and the ſucceſſive improvements down to the preſent time, we refer our readers to the article Scarlet-*Dye*.

Cochineal, when thoroughly dry, if kept in a dry place, and in cloſe packages, may be preſerved many years without alteration. Hellot tried ſome 130 years old, and found it equal in quality to the freſh inſects.

The colouring matter of cochineal may be extricated either by water or alcohol. The alcoholic ſolution is of a deep crimſon colour, and, on evaporation, leaves a tranſparent reſiduum of a deep red, which has the appearance of a reſin, and which affords by diſtillation the products of animal ſubſtances. The aqueous ſolution or decoction of cochineal is of a crimſon colour, bordering on purple, when viewed by tranſmitted lights; and this, if evaporated ſlowly to the conſiſtence of an extract, and then digeſted in alcohol, communicates

municates to this menſtruum a colour ſimilar to the preceding ſpirituous ſolution, a reſiduum of the colour of wine-lees being left behind. This affords, by deſtructive diſtillation, the products of animal ſubſtances.

The aqueous decoction of cochineal, if mixed with a little ſulphuric acid, aſſumes a red colour, inclining to yellowiſh, or orange hue, and a ſmall quantity of a fine red precipitate is thrown down. Muriatic acid produces nearly the ſame change of colour, but occaſions no precipitate. A ſolution of tartar, and, indeed, all acids, change the cochineal decoction to a yellowiſh red, and a ſmall quantity of a pale red precipitate is ſlowly depoſited: the ſupernatant liquor is yellow, but on the addition of a little alkali it becomes purple, the precipitate being at the ſame time re-diſſolved. Alum brightens the colour of the infuſion and gives it a redder hue; a crimſon precipitate is depoſited, and the ſupernatant liquor retains a ſimilar tinge. A mixture of alum and tartar produces a brighter and more lively colour, inclining to yellow; and a precipitate is thrown down, but much paler, and leſs in quantity than where alum alone is uſed. Nitro-muriate of tin throws down a crimſon ſediment in conſiderable abundance, not a particle of colouring matter remaining in the liquor.

On adding a ſolution of tartar, and afterwards of tin, to the infuſion of cochineal, a roſe-coloured precipitate is formed more quickly than in the preceding experiment. The ſupernatant liquor retains a tinge of yellow.

Cochineal, boiled with half its weight of tartar, affords a decoction more inclining to red, and not ſo deep as when boiled with water only. With the ſolution of tin, however, it affords a more abundant precipitate, and of a more intenſe colour. The extraction of the colouring particles of cochineal, therefore, is favoured by the action of tartar, though the liquor appears much paler than the ſimple aqueous ſolution.

The ſulphate of iron forms a brown coloured purple, or browniſh violet precipitate; and the ſupernatant liquor is of a dilute yellowiſh brown. The ſulphate of zinc forms a deep purple, or deep violet; and the acetate of lead a purple-violet precipitate, leſs deep than the preceding; the liquor in both caſes being perfectly colourleſs.

The ſulphate of copper changes the colour of the decoction to violet, and a ſmall ſediment of the ſame colour ſlowly ſubſides.

Berthollet remarks a diſtinctive character in the colouring matter of cochineal, compared with that of madder, treated with the ſame re-agents. Both ſpecies of colouring matter acquire a yellow colour from acids; but if the particles of cochineal be ſeparated by a ſubſtance, which precipitates them from the acid liquor they are diſſolved in, they reappear with their natural colour little changed, whilſt thoſe of madder retain a yellow or fawn-coloured hue. On this account the ſolutions of tin, which retain a great exceſs of acid, and are ſo eminently uſeful in exalting the colour of cochineal, are uſed with little ſucceſs with madder; probably as Mr. Berthollet ſuppoſes, becauſe the combination of the oxide of tin with the colouring matter of madder, retains a larger portion of acid than it does when combined with the colouring matter of cochineal.

We have before obſerved, that the natural colour of cochineal is crimſon, and that, till the diſcovery of the uſe of the ſolution of tin, the colour now called ſcarlet was unknown. The production of this colour was aſcribed to the nitro-muriate of tin only, and more eſpecially to the action of the nitrous acid of that ſolution, with little or no reference to the agency of the tartar, which was always employed in the operation. We are indebted to Bancroft for the correction of this error, and for a ſeries of experiments on the action of other metallic and earthy ſolutions, with the colouring matter of cochineal on woollen.

From theſe experiments it appears, that cochineal, with the nitro-muriate of tin, or common dyers' ſpirits, produced a crimſon only, but with the addition of tartar a good ſcarlet.

Cochineal, with a ſolution of tin in muriatic acid, dyed a beautiful crimſon, and with a ſolution of that metal, by a mixture of tartar and muriatic acid, a beautiful ſcarlet.

Cochineal, with tin calcined by the long continued action of ſulphuric acid, dyed a ſalmon colour, and, with a recent ſolution of tin, a reddiſh ſalmon colour, inclining a little to the crimſon. A ſolution of tin, in equal parts of nitric and ſulphuric acids mixed, afforded a ſimilar colour.

Tin, diſſolved by the pure acid of tartar, dyed with cochineal a very beautiful ſcarlet, inclining a little to the aurora.

Tin very readily diſſolves by pure citric acid, and even by lemon juice; and the ſolution, newly made, dyes with cochineal a moſt beautiful ſcarlet, inclining, like the preceding, a little to the aurora. The citric acid with tin acts, at leaſt as efficaciouſly as that of tartar, in yellowing the cochineal crimſon; nothing, ſays Dr. Bancroft, can exceed the beauty of ſcarlet dyed with the citrate of tin.

The ſolution of tin in vinegar afforded a ſcarlet inclining a little to the crimſon.

The phoſphate of tin produced an aurora, and the fluate of tin a very good ſcarlet.

With other baſes cochineal gave the following colours to woollen:

With nitro-muriate of platina, a red, and of gold a reddiſh brown.

With nitrate of ſilver a dull red, and with muriate of ſilver a lively reddiſh orange.

With the acetate of lead, a purple, inclining to violet; and with nitrate of lead, a delicate lively colour, between the red and cinnamon, but inclining moſt to the former.

With the ſulphate, nitrate, muriate, and acetate of iron, cochineal produces a dark-violet, and even a full black, when employed in ſufficient quantity.

All the preparations of copper appear to debaſe the colouring matter of cochineal, as do thoſe of mercury in a ſtill greater degree; moſt of theſe, whilſt they degrade the colour, ſeem to annihilate a portion of it.

With the nitrate and muriate of zinc, and various ſolutions of biſmuth, cochineal produces different ſhades of lilac. Cobalt and nickel alſo afford various ſhades of lilac and purple. The ſulphate of manganeſe an orange, and the nitrate of manganeſe a colour reſembling a madder red.

It has been before obſerved, that, with the aluminous mordants, cochineal affords its natural colour, or crimſon. Dr. Bancroft has alſo examined the effects of other earthy ſolutions.

Lime-water, with cochineal, dyes a purple, which took but ſlowly, and required long boiling.

Sulphate of lime a full dark red, and nitrate of lime a lively red, approaching to ſcarlet, and muriate of lime a purple.

The ſolutions of barytes and of magneſia, afforded various ſhades of lilac, and even the ſolution of ſilex in cauſtic alkali, precipitated by the addition of an acid, affords a full rich pleaſing purple, which proved ſufficiently durable.

The foregoing experiments repeated on ſilk gave leſs advantageous reſults. Cochineal, indeed, with the aluminous baſis, dyes the crimſon colour as well and as durably on ſilk as on wool. The modes of producing this are well known,

known, and will be treated of hereafter; but in general, with the other earthy and metallic baſes, cochineal produced ſimilar but much paler colours than on wool.

The little diſpoſition manifeſted by the colouring matter of cochineal to unite with cotton, and the celebrated experiment of Mr. Dufay to illuſtrate this, are well known. He cauſed a piece of cloth to be manufactured with a woollen web and cotton woof, and having ſubjected it to the ordinary proceſs of dyeing ſcarlet, found that the wool had taken a moſt beautiful ſcarlet, whilſt the cotton remained perfectly white. Subſequent experiments have ſhown that this effect ariſes not from the total want of affinity between the colouring particles of cochineal united to tin, and the fibres of cotton, but from a ſtriking and powerful difference in the force with which the colouring matter is attracted by the two ſubſtances. When cotton *alone* is ſubjected to the ſame proceſs, it takes a ſcarlet colour more ſlowly indeed, and paler than that imbibed by woollen, yet ſufficient to prove its diſpoſition to ſuch union, when not counteracted by more powerful affinities. When cotton and wool, however, are *jointly* ſubjected to the operation of ſcarlet dyeing, the latter, by its ſtrong attraction, draws, and excluſively appropriates to itſelf, all the colouring matter in the veſſel before the cotton has had time to engage any part of it. It is owing to this weaker attraction between the fibres of cotton and the ſcarlet dye, that this latter is ſo much leſs permanent on cotton than on wool; and it is alſo from this want of ſufficient attraction that the cochineal colour is found to take moſt beneficially on cotton, when the baſis has firſt been applied ſeparately.

Cochineal is ſometimes uſed by calico printers in topical dyeing, but more frequently in the preparation of thoſe colours for the pencil, which are deſcribed under the article COLOUR *making*.

The mordants uſed for cochineal are thoſe employed with madder. The acetate of iron, or iron liquor for black, diluted ſolutions for various ſhades of purple or lilac, and mixtures of the acetates of iron and alumine for chocolates, blooms, &c. &c.

With the common aluminous mordant, printed and rinſed off the ſame as for madder red, cochineal affords a bright and beautiful crimſon. It is, however, much leſs fixed than madder, and cannot ſupport repeated waſhing and expoſure. It is applied chiefly on fine cloth and delicate muſlins, when the ſolidity of the colour is oftentimes an object of leſs conſideration than its beauty. An addition of one-tenth, or fifteenth, of galls to the cochineal, gives it greater ſtability, but this permanency is gained at the expence of its luſtre. The fine crimſon diſappears, and the colour approaches more to the red or middle hue. An advantage attending the uſe of cochineal, is its little effect on the white or unprinted part of the cloth, which acquires no ſtain in the dyeing, but what is completely removed by ſimple waſhing, or, in ſome particular caſes, by very gentle branning. From two to three ounces of cochineal, according to the fulneſs of the pattern, are ſufficient for a piece of light ground. The pale delicate crimſon grounds, with white objects, require from four to five ounces. It muſt be finely ground, and incloſed in a linen or cotton bag, ſuſpended in the dye-copper, from whence it can be occaſionally taken and ſqueezed or wrung, for the more complete extraction of the colour.

In dyeing with cochineal, the value of this drug renders every precaution for economizing its uſe indiſpenſably neceſſary, and a conſiderable ſaving is made by diminiſhing as much as poſſible the quantity of the dye liquor. It is well known, that colouring matter of any kind, held in ſolution in the dye-copper, can only be exhauſted to a certain degree, even by freſh and undyed goods; there is a certain point at which the affinity of the water for colouring matter becomes equal to that of the ſtrongeſt mordants, and all that is thus retained may be conſidered as totally loſt, except when freſh portions of colouring matter are added to the already exhauſted liquor, and the operation of dyeing again renewed, in which caſe the loſs is inverſely as the number of ſucceſſive operations performed in the ſame liquor. In dyeing with cochineal, therefore, no more water ſhould be uſed than is barely ſufficient to cover the goods when preſſed down cloſe into the copper, with a ſtick as they come over the winch, and three ſucceſſive dyeings, at leaſt, ſhould be paſſed through the ſame liquor before it is let off, and the copper repleniſhed with freſh water. Long continued heat has a tendency to injure the cochineal crimſon, and incline it too much to the purple hue; each dyeing, therefore, ſhould be withdrawn ſhortly after it has attained the boiling point. The firſt ſets may be boiled three minutes; the ſecond, one; the third ſet may be kept five or ſix minutes at the boil, if it conſiſts of darker colours, ſuch as chocolates, dark purples, &c.; but if crimſons, the colour, without boiling, will incline very much to the purple hue, and be much inferior to the firſt, and even to the ſecond ſets. On this account it is proper, when the work will admit of it, to dye the pale crimſon grounds firſt, follow after with the ſtronger light grounds, and, laſtly, with the darker colours above-mentioned.

The uſe of tin veſſels in dyeing ſcarlet or woollen, (where the acid ſolutions uſed in that operation render them indiſpenſably neceſſary) has induced many calico printers to employ them in dyeing cotton, where no acid ſolution is preſent, and where the good effects of tin may be ſuppoſed not to apply. It is certain, however, that the hue of the pale and delicate crimſon grounds produced in a tin veſſel is much ſuperior to that produced in copper, and the cauſe of this difference is ſatisfactorily explained by the experiments of Mr. Thomſon. From theſe experiments, which will be more fully detailed in another part of this work, it appears that the colouring matter of cochineal poſſeſſes very diſtinct acid properties.

Turnings of pure ſoft iron digeſted in a ſtrong decoction of cochineal were diſſolved, with diſengagement of hydrogen gas. The ſolution, at firſt purple, gradually acquired a more intenſe colour, approaching to black. Expoſed to the atmoſphere, it gradually abſorbed oxigen, and let fall a black precipitate. It communicated to cloth a dark grey or purple colour, which was not removed by waſhing. With tin the decoction of cochineal formed a beautiful crimſon ſolution, and, with copper, a dull crimſon inclining to purple; both theſe ſolutions imparted their colour to cloth, which rinſing did not remove. Hence it appears that the difference in the colours, produced in a tin and in a copper veſſel, ariſe from the action of the colouring matter on the ſubſtance of the veſſel itſelf.

The colouring matter of cochineal alſo acts powerfully on the earths and metallic oxides, or on its own combinations with them or cloth. A piece of calico impregnated with a weak aluminous mordant, and dyed in a ſtrong decoction of cochineal, takes at firſt a dye which is, however, ſpeedily removed, and the mordant itſelf ſoon after carried off the cloth. The ſame takes place with the dilute ſolutions of iron. In dyeing with cochineal, therefore, in the way preſcribed above, ſome care is neceſſary in the management of thoſe goods, on which weak as well as ſtrong mordants are applied, leſt with the treatment neceſſary to bring up the latter to their proper ſtrength and fulneſs, the former be totally deſtroyed.

The beautiful pigment carmine, uſed chiefly in miniature

and water-colour painting, and ſometimes under the name of rouge, to freſhen the cheeks of pallid or faded beauty, is alſo a preparation of cochineal. It is a light, ſoft, velvety powder, of a moſt rich and magnificent ſcarlet, inclining a little to crimſon. It was formerly made from kermes, whence its preſent name is derived.

The preparation of carmine, notwithſtanding the numerous proceſſes detailed in various works, ſtill remains one of thoſe ſecrets which are confined to the laboratories of a few. Its conſtitution, indeed, and the general nature of the proceſs for obtaining it, are well known; but excellence in colours of this kind often depending on particular hue, ariſing from minute but important conditions in the preparation, approved proceſſes are guarded with religious care, confined to the workſhops that gave them birth, in which myſtery and prejudice are deſpotic.

We ſubjoin the following formula without vouching for its merit; it is, however, at leaſt, as good as any other publiſhed.

Pour two quarts of fine clear river water into a clean copper pan, and, when boiling, add two ounces of the beſt grain cochineal, finely ground and ſifted. Boil ſix minutes, ſtirring carefully the whole time. Add ſixty grains of fine Roman alum in powder, and boil three minutes longer, after which withdraw it from the fire and let it cool a little. Decant off the liquor carefully from the grounds, and ſtrain through a ſilk ſieve fine enough to retain the undiſſolved grains. Pour it into well-glazed porcelain diſhes and ſuffer it to remain undiſturbed three or four days, after which time again decant the red liquor into other diſhes from off the ſediment which has formed, and which, dried in the ſhade and free from duſt, forms the fine carmine. Another depoſition takes place at the end of a few days from the decanted liquor, which forms a good carmine of ſecond quality, and there ſtill remains colouring matter ſufficient in the remaining liquor to afford a rich lake.

The following proceſs, not very different from the former, has been recommended; and, if carefully purſued, will yield a pigment greatly ſuperior to the carmine that is generally met with. Into a fourteen-gallon boiler of well-tinned copper put ten gallons of diſtilled or very clear rain water (ſpring water will not anſwer the purpoſe). When the water boils, ſprinkle in, by degrees, a pound of fine cochineal, previouſly ground in a clean ſtone mortar to a moderately fine powder; keep up a gentle ebullition for about half an hour, and then add three ounces and a half of cryſtallized carbonat of ſoda; in a minute or two afterwards draw the fire, and then add to the liquor an ounce and a half of Roman alum, very finely pulverized; ſtir the maſs with a clean ſtick till the alum is diſſolved, then leave it to ſettle for 25 minutes, and afterwards draw off the clear liquor with a glaſs ſyphon, and ſeparate the reſt of the fluid from the ſediment by ſtraining it through a cloſe linen cloth. Replace the clear liquor in the boiler, and ſtir in the whites of two eggs, previouſly well beaten with a quart of warm water; then light the fire again and heat the liquor till it begins to boil, at which time the albumen of the eggs will coagulate and combine with the earth of the alum and the fineſt part of the colouring matter; this ſediment is the *carmine*, and being ſeparated by filtration, and well waſhed on the filter with diſtilled water, it is to be ſpread very thin on an earthen plate, and ſlowly dried in a ſtove; after which it is fit for uſe. The fineſt part of the colouring matter of the cochineal being thus ſeparated, the reſidue may be employed in the preparation of *red lake* in the following manner: Add two pounds of pearlaſh to the red liquor from which the carmine was precipitated, and return it into the boiler together with the dregs of the cochineal, and boil the whole gently for about half an hour; then draw the fire, and, after the ſediment has ſubſided, drain off all the clear liquor into clean earthenware veſſels. Then pour upon the ſediment a ſecond alkaline ley, prepared by diſſolving a pound of pearlaſh in two gallons of water, and boil this alſo upon the dregs for half an hour; by which proceſs the whole of the colouring matter will be exhauſted. Separate by filtration the liquor from the dregs, and return both the alkaline ſolutions into the copper. When this bath is as hot as the hand can bear, add, by degrees, three pounds of finely pulverized Roman alum, obſerving not to add a ſecond portion till the effervеſcence from the firſt has entirely ſubſided. When the whole of the alum has been put in, raiſe the fire till the liquor ſimmers, and continue it at this temperature for about five minutes, at which time, if a little is taken out and put into a wine glaſs, it will be found to conſiſt of a coloured ſediment diffuſed through a clear liquor; after ſtanding quiet a while the greater part of the clear ſupernatant liquor may be poured off, and the reſidue being placed on the filter, will there depoſit the coloured lake, which, after being accurately waſhed with clear rain water, may be covered with a cloth, and allowed to remain for a few days till it is half dry: it is now to be ſeparated from the filter, to be made up in ſmall lumps, and placed in a ſtove to dry. By this management a pound of good Mexican cochineal will afford one ounce and a half of carmine, and about a pound and a quarter of red lake.

If the colour is required to incline ſomewhat towards ſcarlet, this may be effected by grinding along with the cochineal from a quarter to half an ounce of the beſt annotto.

The French add to the infuſion of cochineal a ſmall proportion of *autour*, a bark containing yellow colouring matter, and alſo of *chouan*, a greeniſh yellow ſeed, both from the Levant. They ſerve to brighten the hue of the carmine, and incline it more to ſcarlet. Carmine has a ſlight taſte, eaſily recognized as that of cochineal. It is ſparingly ſoluble in water, to which it communicates its own colour. Mixed up with water it works ſtiffly with the pencil and affords a poor colour. Ammonia diſſolves it inſtantly, forming with it a deep tranſparent crimſon-coloured ſolution, inclining much to purple. This is the teſt of its purity, for the inferior or adulterated carmine is inſoluble, and falls to the bottom. The painters generally grind or mix it with ammonia for the deep rich reds, and its ſolutions in that alkali afford moſt beautiful pink or roſe colours.

Carmine appears to be a lake in which the colouring principle predominates very much over the baſis; hence its ſolubility in ammonia, which the true or perfect lakes do not poſſeſs.