

and their use was not permitted in the reign of Charles II. Indigo at the present time is one of our principal dyes. It is a native of India, although it is cultivated in many tropical countries. A considerable trade is done in Bengal, from whence we get such large amounts. It was denounced as "food for the devil," and forbidden by Parliament, and this Act remained in force for the greater part of 100 years. When these prejudices were overcome in the eighteenth century, dyeing made remarkable progress. To the Indians we are indebted to the discovery of Turkey red. The following is a Swiss method for 440 lbs. cotton, 29½ lbs. fat oil, 55 gallons of carbonate of potash, 13½ gallons of cow dung, fermented and brought into a pulpy state with cow urine (the above is repeated four times), 117½ lbs. oil, 220 lbs. carbonate potash, 55 lbs. cow dung, 16½ lbs. gall-nuts, 14 lbs. Silician sumac, 47 lbs. alum, 77 lbs. c. potash, 50 lbs. madder, 6 lbs. sumac, 374 gallons ox-blood, 11 lbs. soap, 66 lbs. chloride of tin, 200 lbs. nitric acid. The time was, in some instances, two months. We can now dye a corresponding color in two hours on woolen.

Without going into abstruse chemical equations and formulas, which undoubtedly would be most invaluable to all dyers if they possessed a sufficient knowledge of chemistry, it must be said that if the chemist and dyer could assimilate or mix up their ideas more, great advantage would result, and were the dyer's knowledge combined with thoroughly correct and scientific chemical information, the British dyer need not be ashamed nor fear any rival from foreign countries. Although it must not be inferred that every chemist is a dyer, every dyer ought to be a chemist. It has often been asked, will reading and understanding chemistry make any person match colors any better? No; but it gives the knowledge what chemical phenomena takes place when certain stuffs are put into a vessel; it would also suggest and assist in producing new colors, which it is impossible to do without chemical knowledge. The fact is, the non-chemical dyer must always play second fiddle, and that fact alone must be very annoying to a sensitive man. We must all admit that whenever a new dye comes out (and their name is legion), it comes from the chemist. Chemistry would also suggest methods of altering any shades that have gone wrong in dyeing (and that very often takes place with the best of dyers), which is a most important and expensive item to manufacturers, for such colors are very often consigned to the black furnace, which means in the case of a cochineal red—say 6d. per lb. dyeing, and the yarn of a much better quality than blacks are dyed from; then the same expense takes place in dyeing black as though it was fresh-scoured yarn. Hundred and thousands of instances as above have happened through the dyer's inability to make the necessary alteration.

Now one most important and vital consideration in dyeing is good and pure water, as upon its goodness depends the probability of good and lasting colors. It may be mentioned that the impurities of water are carbonates of lime, magnesia, iron, sulphate of lime, etc. The water most suitable for dyeing must fulfill the following conditions: It must not be too hard; it must not deposit a brown sediment of oxide of iron when freely exposed to the air for some hours, nor must it show anything of a blue nature when a few drops of a solution of red or yellow prussiate of potash is introduced into it, which shows a presence of iron. Every dyer should be strongly recommended to have a little litmus paper by him—turmeric and archil—the turmeric litmus paper is the most sensitive to alkaline properties, turning it brown, and the archil litmus turns somewhat red in acids. It may be tested with some degree of accuracy by putting into it a little logwood, and making a similar test with distilled water. When it boils it ought not to throw up a reddish brown scum of oxide of iron. Another and most simple test is to dye samples with distilled water, and afterwards ordinary dyeing water; and if results are about the same its suitability for dyeing purposes may be relied on.

Another most important item in obtaining good and solid colors is scouring. Unless your material to be dyed is free from dirt, grease and fatty acids, you cannot expect good results. Now, a great many articles are used for scouring, such as soap, soda, ammonia, urine, caustic soda, resin, pearl-ash, and many more, and it is hard to say which is best. Some say one, and some another, and further scouring naturally affects the colors according to method; but in all cases wash out the yarn in lukewarm water, before dyeing, and let the yarn drain.

It may be mentioned that colors, as a rule, are dyed with a due regard to fastness, according to where and what material they have to be worked into. For instance, the Kidderminster method of dyeing would not, for one moment, do for the cloth or West of England trade. And one class of shades which occupies no unimportant part of carpet manufacturing is the drab, which in cloth is more solid and much cheaper.

#### TO DYE SILK WITH ANILINE GREY OR BENGALINE.

BENGALINE has for some time been playing an important part in silk-dyeing. It is used to produce a number of good greys, modes, deep blues, dark greens, etc. These colors are not appreciably more expensive than similar ones produced with dye woods, and the same beck may be used over again for a long time. An old soap-beck may generally be used, with a little sulphuric acid, and the tone of the color may be modified in an almost endless manner by the addition of a little orchil, young fustic, etc.

For heavy greens turmeric may be used in the same beck along with the grey, and some aniline blue, and they may be afterwards raised by being taken through picric acid. For so-called "marine blues," a mixture is taken of bengaline and aniline grey. The largest manufacturers of aniline grey and bengaline are A. Schlumberger and Max Singer, of Tournaï. Bengaline is dissolved in the manner usual for aniline colors, and it is well to filter alcoholic solutions.

To make up the dye-beck take for each 2 lbs. 3 ozs. of silk, a pail of the old soap liquor used for ungumming, add 2½ ozs. of sulphuric acid, heat to 140 deg., and then enter the dissolved color and the silk. Raise the temperature to a boil. Afterwards rinse well.—*Teinturier Pratique*.

#### PRINTING WOOLENS A COCHINEAL RED.

By M. KIELMEYER.

COCHINEAL reds are obtained upon wool in printing by a mixture of a decoction of cochineal, salt of sorrel, salt of tin, oxalic acid, and a thickening; or for decoction of cochineal, or salt of tin, we may substitute a tin lake of cochineal. The acidity of these mixtures gives to the color of the cochineal a yellowish tone, which remains after soaping, or after passage through lime-water, if the pieces are to be steamed. The author remedies this inconvenience by the

addition of acetate of soda. In the cold this admixture is without effect, but, when heated, the acetate of soda acts as an alkali, and loses its acetic acid under the influence of the oxalic acid, which thus becomes neutralized. The color obtained presents a warmer and redder tone; although in appearance less full, in reality it is less brown. If a yellow tone is desired, it is better produced by the addition of a yellow coloring matter than by a change due to the action of a free acid. The author prefers the following formula:

Gum.....	14 parts
Water.....	15 "
Cochineal lake.....	17½ "
Young fustic lake.....	2½ "

Heat to 140° Fahr., and when the gum is dissolved, add:

Oxalic acid.....	1 part
Pure salt of sorrel.....	1½ "
Acetate of soda.....	2½ "

After printing, dry at a gentle heat for one or two days expose for an hour to very hot steam, dry, wash, and dry again. The shade obtained is very like that yielded by a corresponding dye-beck.

The addition of acetate of soda gives much purer tones in steam yellows and oranges with fustic, and especially in magentas upon cottons.—*Dingler*.

#### THE COCHINEAL REDS UPON WOOLEN TISSUES.

By M. KIELMEYER.

The author recommends an addition of acetate of soda to the colour to counteract the effect of the cochineal. He prefers the following mixture:—

Gum.....	14.0 kilos.
Water.....	15.0 "
Cochineal lake.....	17.5 "
Young fustic lake.....	2.2 "

The mixture is heated to 60°, and when the gum is dissolved there is further added:—

Oxalic acid.....	1.00 kilo.
Pure salt of sorrel.....	1.75 "
Acetate of soda.....	2.25 kilo.

He adds that the addition of acetate of soda greatly improves the tone of the steam yellows and oranges produced with young fustic. The benefit is still more signal in printing cottons with magenta.—*Dingl. Pol. Jour.*

#### IMPURITY OF THE GRANULATED WHITE SUGARS OF THE MARKET.

By EDWARD RUNYON, New York.

It was found on comparison that the several brands of supposed A No. 1 granulated sugars of the market produced syrups of different tints, which suggested an examination of their quality.

Samples were found containing a considerable proportion of ultramarine, which after several days' standing was deposited. Syrups made from sugars having the ultramarine impurities are discolored, being usually of a pale straw color.

This adulteration and additions of sulphate of tin, alum, etc., are used by refiners in the interest of dollars and cents, and are designed to neutralize the yellow tint in imperfectly refined sugars. The practice is known among refiners as adding the complementary color.

Unquestionably ultramarine adulteration is chemically injurious, being decomposed by fruit or organic acids with evolution of sulphuretted hydrogen, which produces a disagreeable taste; aside from this serious objection, the official syrups, instead of being colorless and bright, are tainted and dull in appearance. Pure sugars can be had by purchasing from first-class manufacturers, and paying a slight advance on the price of ordinary marketable granulated white sugar.—*Am. Jour. of Pharmacy*.

#### WHY MILK SOURS DURING THUNDERSTORMS.

By MALVERN W. ILES, Ph. D.

THERE have been various surmises with regard to this subject; none, so far as we have been able to learn, have been substantiated by experiments.

In order to see if milk really did sour during heavy rain and thunderstorms, I made several observations which proved to me that the opinion so commonly held by dairymen was not erroneous.

My experiments to arrive at the cause of the phenomena thus observed may be stated as follows: I filled an eudiometer tube (300 c.c.) with skimmed morning's milk, then introduced 100 c.c. pure oxygen gas; then, by the use of an ordinary battery and a small Ruhmkorff coil, sparks of electricity were made to pass through the oxygen for five minutes. The current was then broken, the tube shaken up, and allowed to stand for five minutes. The milk did not appear quite so opaque and showed a noticeable acid reaction. On continuing the current for five minutes longer, making in all ten minutes, the milk curdled very perceptibly, and showed a decided acid reaction. The contents of the tube, on standing for twenty minutes, had reached the consistency of ordinary sourmilk, or "bonny-clabber."

From the above experiments it will be seen that the oxygen was converted into ozone, which we think may be stated as the cause of the rapid souring of milk during thunderstorms.

The increased acidity is due to the formation of lactic acid, and most probably some acetic acid, by means of the ozone, one or both of these acids thus causing the casein to be precipitated.—*Chemical News*.

JEANNOTTE makes use of the following process for replacing indigo by aniline in dyeing animal and vegetable fibres, whether woven or not. The essential feature of the process is the oxidation of the salts of aniline in a very dilute bath in contact with the goods to be dyed. The following is a specimen formula for cotton: Aniline, 5 parts; muriatic acid, 3 parts; sulphuric acid, 12 parts; bichrome, 5 parts. The muriate of aniline is first prepared, the bichrome is then dissolved separately, and the whole is diluted with 1,000 parts of cold water. The cotton is worked for about an hour, then washed and taken through a slightly alkaline beck at 104 deg. Fahr. To give solidity to the indigo-blue shade obtained it is well to top the goods slightly with an aniline blue, or, better still, to take them through a weak indigo vat.

It is said that India is not favorable for the growth of Sea Island cotton, and this statement is based apparently on practical experience.

#### OPEN AIR FOR CONSUMPTIVES.

By H. B. WHITE.

PURE air is the great desideratum, either as the chief therapeutic agent, or as of equal importance to any other in the treatment of any disease.

This truth is recognized now by all members of the profession, more or less, though the popular mind does not yet seem to realize that it is of the greatest vital importance. There has been great advance in therapeutics within comparatively a few years, but in no direction has there been more improvement than in the recognized importance of fresh air for the preservation of, and restoration to, health in the animal economy. The time was, and that too within the memory of very many members of this Society, when fresh air was considered very well for healthy people, for they could stand it, but physicians were cautious about exposing their patients to its deleterious effects, especially those suffering with fevers and kindred zymotic diseases. How often have I seen in such cases the windows securely caulked, and the door of the sick chamber carefully guarded, to prevent the slightest breath of pure air from reaching the patients! It was considered too strong for them. The bare thought that such a state of things was ever possible may well create astonishment in the minds of some here who have been educated under a better hygienic system, but we are still liable to meet just such murderous practice, and called upon almost daily to combat the prejudices of not only the ignorant, but educated people, against the admission of this best of all therapeutic agents into the sick room.

But a few years ago a case came under my notice, illustrating this ignorance and prejudice: A lady, in excellent health, confined with her first child, labor natural and easy, everything seemed to promise a speedy restoration to her normal condition of health and strength.

By orders of her physician, the windows of her room were secured against the intrusion of fresh air, and the door so carefully guarded as to admit the least possible amount of air with the necessary entrance and exit of her nurse. As a consequence of such treatment, digestion became impaired, appetite failed, mammary abscesses on both sides followed one after another, with no disposition to heal, and instead of gaining strength, or even retaining what she had, she continued to lose ground, and was for months unable to leave her room. It did not require an acute observer to lay the blame of all this misery upon the exclusion of fresh air. Not many physicians are thus groping in an unhealthy atmosphere. Thanks to scientific progress, sunlight and pure air are recognized as remedial agents in the maintenance of good health, and in the cure of disease. We can now open doors and windows and "throw physic to the dogs," without risking a charge of malpractice.

One of the standing jokes upon our profession, viz.: the oft-told story of the doctor congratulating his patient upon his improvement by remarking that he must have followed his prescription, and getting for answer, "If I had, I would have broken my neck, for I threw it out of the window," may be turned to good account by the supposition that he forgot to close the window as the medicine went out.

My object in this article is to emphasize the proposition that the more we learn to rely upon the stimulating, invigorating effects of pure fresh air, the less we will care for drugs.

But in many cases it is not sufficient to simply open the doors and windows of the invalid's room to give him the benefit of absolutely pure air. It cannot be had in our houses, even in the best constructed and the most favorably situated for free ventilation. Neither can it be found out of doors, in the streets of our crowded cities. We all see the immediate beneficial effects of a change from Brooklyn to Coney Island for our little patients suffering with cholera infantum. To what is it due? Not to a change of climate, for that is the same; not to the sea air, for Brooklyn has that; but to the change from the impure air of the city to the pure air that comes sweeping in from the ocean.

How we watch our patients' stomachs, carefully direct the quantity and quality of their food, note the slightest symptoms of indigestion, yet the condition of the air they breathe is of vastly more importance. The purity of the blood depends more upon it than the food we eat. The source of a majority of the diseases that afflict the human family and destroy life, is found in the deadly miasms that float unseen in the atmosphere all around us, and which we unconsciously inhale in our very efforts to live. In the midst of life we are indeed surrounded by death. Every man consumes daily four pounds of oxygen, and exhales from the lungs a much greater weight of carbonic acid. Besides this, animals constantly exhale from their bodies effluvia highly poisonous and deadly. Also from the soil-pipes of our houses, and the gutters and sewers of our streets, emanates the morbid principle, zymosis, which rapidly spreads through the air, and proves so fertile a source of disease. In view of all these considerations, how important is it that we seek every possible means of obtaining pure air in the prevention and treatment of disease!

Our late war furnished abundant opportunities for verifying the wisdom of this practice. Our hospital barracks were well constructed to secure good ventilation—much better in this respect than our modern houses. The open ridge the whole length of the building, the open window by the bedside of every patient, to say nothing of the many openings left by hasty, careless construction, would certainly seem to furnish all that was desirable in that direction. But experience soon proved that there was purer air out of doors, and if the fever took an unfavorable turn, or the wound assumed an unhealthy aspect, the patient was ordered into the open air, with only the roof of a tent for his covering, when his condition would almost invariably improve at once. But my purpose now is to speak more particularly of the necessity of open air in the treatment of consumptives. I am aware that in this there is nothing new; and that I run some risk of meeting your disapprobation for taking the time of the Society in discussing a method of treatment so generally recognized as correct. Yet I think it is not sufficiently insisted upon, especially for the prevention of this disease, and in the treatment of the early stages, when it promises the most benefit. I hold that if a patient cannot leave home to enjoy the beneficial treatment of out-door life in a climate suited to his case, he must seek it in our climate, with all its changes. Dress suitable to the weather, and be out all of the time, no matter what the meteorological conditions, should be the advice given to consumptive patients who are able to be out at all.

The universal testimony of scores of persons who crossed the Plains, mostly on horseback, during the years 1850 to 1856, attributed their recovery from incipient phthisis to