Chemistry, Physics, Technology.

CHANGING THE COLOR OF THE HAIR.

Dr. D. W. Prentiss, of Washington, D. C., Professor of Materia Medica in the National Medical College, recently reported a case of remarkable change in the color of the hair from light blonde to black in a patient while under treatment by pilocarpin. The patient, a young woman, had an aggravated attack of uremia, yet it is thought this disease is of too common occurrence for such an effect to have escaped observation, if by any chance the change in the color of the hair could have been produced by the disease. The use of the pilocarpin was begun on the 16th of December, 1880, and twenty doses were administered hypodermically up to the 22nd of February, 1881, requiring the use of thirty-five to forty centigrammes of pilocarpin. The hair was first noticed to be changing color on December 28, 1880; from this last date the alteration was rapidly progressive, until a light blonde hair with a yellow tinge became first a chestnut brown, and on the 1st of May, 1881, was almost a pure black. The growth of the hair was also more vigorous and thicker than formerly. It was also much coarser, as could readily be seen by a comparison of specimens. There was a corresponding change of color of hair upon other portions of the body. Dr. Emil Bessels, of the Smithsonian Institute, has made a microscopical examination of the hair, and reports that it is in every respect normal, that the change in color is due to an increase of the normal pigment, and not to a dye. There was also a change in the color of the eyes from a light blue to a dark blue.

Changes in the color of the hair are of frequent occurrence, as a result of sudden violent emotions, such as fright, great grief, or even sudden joy; the change, however, is always from dark to white. But a rapid change from light to black is nowh re reported. In mammals and birds, however, we have numerous instances of changes of color in both directions,—from dark to light, and the opposite, this change being due not merely to new growth, but to an actual alteration of the color of existing hairs or feathers.

Dr. Weinland investigated this subject from museum specimens, and was lead to the conclusion that change of color was due to increase or diminution of oily matter. The fresh feathers were examined from the breast of a merganser, and the red color found to be due to numerous lacunæ were filled with a reddish oil-like fluid. When dried, the feathers bleached, and it was then found that the lacunæ were filled with air only. According to this theory, an increase of nutrition would have a tendency to darken the hair, and *vice versa*. This is borne out by the fact that dark or black hair is almost always thicker and coarser than light hair, and also by the change in hair to gray and white as age advances and the processes of nutrition becomes enfeebled. So also when the hair is thin, shaving the scalp will generally cause it to become thicker, firmer, and darker. This can only be through the influence of nutrition.

It gives us a clue also to the *modus operandi* of the change in the case reported, for we know by clinical experience that pilocarpin increases the nutrition of hair, as shown by its augmented growth. We have therefore in this case both positive and negative evidence in support of the view that the change in the color of this patient's hair was due to the pilocarpin, and this view is strengthened from the fact that in a case of membranous croup successfully treated with pilocarpin, June 1881, the administration of the drug for six days was sufficient to produce a distinct change in the color of the child's hair.

INFLUENCE OF ANIMAL AND VEGETABLE OILS ON MACHINERY.

Since mineral oils have come into use for lubricating purposes their manufacture has reached such perfection that their general adoption, in preference to any animal or vegetable oil, is only a question of time. The advantage derived from the use of good mineral oil is so decided that every one who possesses any technical knowledge must be convinced of the same. Mineral oils are not fats, but hydro-carbons, and are obtained from the natural crude oil after the volatile, or light oils, have been removed. Fats, however, whether animal or vegetable, whether in a fluid or solid state, contain not only hydro-carbon, but also oxygen, and represent a union of organic acids, called fat acids, with oxide of glyceryl. The greatest possible differerence exists between mineral oils and those just mentioned—viz., animal and vegetable—they having, in fact, nothing in common except that they are both greasy to the touch. It is, therefore, unreasonable to ask what amount of fatty substance a mineral oil contains, because in its purest and most useful state it should not contain any fatty matter. Mineral oils, of proper specific gravity, lubricate as effectually for a lengthened period of time as vegetable or animal oils do when but freshly applied. The lubricating power of mineral oils increases in proportion to their specific gravity; therefore, on all heavy machinery, where friction has to be overcome under great pressure, the heaviest oils should be used. Mineral oils which are properly manufactured, and consequently free from gum and acid, retain their lubricating power unchanged in all temperatures so long as there is any oil on the bearings. Vegetable or animal oils, on the contrary, however pure they may be, gradually lose their lubricating power, owing to their combination with the atmospheric oxygen, which causes them to become thick, gummy, and finally, dry—thus necessitating the frequent and thorough cleaning of bearings and shafts. Mineral oils have no tendency to oxidate, and consequently do not gum or dry. Of course, we only speak here of the heavy oils, the oils of small specific gravity being unsuitable for lubricating purposes. Vegetable and animal oils chill and become solid with slight cold, while mineral oils remain liquid in the coldest weather, severe frost causing them to become somewhat thicker, but never solid. The principal reason, however, why animal and vegetable oils should be superseded by mineral is the destructive effect of the former on the iron parts of machinery. There are various causes for this. As already stated, fats consist of a combination of fat acids and oxide of glyceryl. The combination, by the action of water or steam, becomes decomposed, setting free the oxide of glyceryl. (It is in this manner, and based on this theory, that stearine is manufactured.) The same decomposition also commences, though slowly, in ordinary temperatures, through contact with the atmospheric moisture. The acids thus generated exercise a corroding influence on the iron, forming what is called metal soap. The iron gradually becomes porous, and in time is destroyed. To this injurious influence all parts of machinery are subjected, whether they come in contact with steam or not. The affinity of oxide of iron to the acids of fat is so great that, chemically speaking, the iron corrodes immediately it is brought into contact with fat.—*Dr. L. Marquardt.*

MINERAL LUBRICATING OILS.

Dr. Oscar Bremken determines:

1. The specific gravity.
2. The temperature at which inflammable and continuously combustible gases are evolved. For this purpose he heats the oil on the sand bath in a crucible, 6, 4 c.m. wide and 4.7 in depth, fille l to 1.2 c.m. from its edge, and after the experimental temperature has been attained he removes it from the sand bath and passes a small gas flame over it, as in Hannemann's petroleum test, trying it first from 5 to 5 degrees and afterward from 2 to 2. Oils which foam strongly when heated are unfit for many purposes. He observes, further:
3. The point of congelation.
4. The undissolved constituents on dissolving 10 c.c. in an equal volume of ether, filtering and weighing the washed residue.
5. The reaction with soda lye of sp. gr. 1.40; 10 c.c. of the oil are well shaken up with 5 c.c. of the soda lye and heated in the boiling water bath. After repeated shaking the lye must remain clear, and its volumes must not be altered. The test tube used in this experiment must be absolutely free from grease.
6. The reaction with nitric acid acid of sp. gr. 1.45; on agitating equal volumes no rise of temperature, or but a very slight one, should be perceptible. This test shows the absence of tar oils.
7. Reaction with sulphuric acid, sp. gr. 1.53; equal volumes are shaken up and heated in the water bath, when the acid should take merely a pale yellow color. A brown or black coloration shows imperfect refining, or, along with No. 6, the presence of tarry oil.
8. Behavior on shaking with water; the water must remain clear, free from a whitish turbidity, and should not have an acid reaction.—*Zeitschrift Anal. Chimie.*

To keep machinery from rusting, take ½oz. of camphor, dissolve 1lb. of melted lard; take off the scum and mix in as much fine blacklead as will give it an iron colour. Clean the machinery and smear with this mixture.