

boiling point, the oils and resin are then introduced, stirring continually, for one hour. The fire is stopped as soon as the ebullition takes place; then 2,400 lbs. of lye at from 15° to 18° are added, and the boiling is continued for 5 hours, after this another addition of lye at 25° is added (about 2,400 lbs.), and as soon as the whole mass has assumed a certain consistency another quantity of lye is added at from 20° to 30° by the alkalimeter. The lye separates from the soap formed, and the mass is then ready for the cooking; the lye is drawn off and a new quantity of soft lye at from 20° to 25° Baumé is added (about 7,000 lbs.), no fire is needed as the whole mass is warm enough to maintain its fluidity; it is stirred for an hour and then drawn off; 8,000 to 9,000 lbs. of the lye No. 2 are then added at 25° alkalimeter, and the whole is boiled, and kept boiling from 4 to 5 hours, the soap is then made, and the surplus lye drawn off.

## CALCULATION ON SOAP NO. I.

Cotton seed oil, crude, 10,000 lbs. at 7½c. per lb. ....	\$750-00
Resin, 2,000 lbs. at 1c. per lb. ....	20-00
Lye.....	250-00
Palm oil 1,000 lbs. at 12c. per lb. ....	120-00
Fuel.....	15-00
Labor.....	40-00
Taxes, interest, etc.....	25-00

Total.....\$1,220-00

Yield 13,000 × 150 per cent = 19,500 lbs. of soap.

## SOAP NO. II. IN QUALITY.

(Cotton seed oil) foot oil resulting from the operation of refining, 10,000 lbs. at 4c. ....	\$400-00
Resin, 4,000 lbs. at 1c. ....	40-00
Lye.....	250-00
Fuel.....	15-00
Labor.....	40-00
Insurance, taxes, etc.....	25-00

Total.....\$770-00

Yield 14,000 × 125 per cent = 17,500 lbs. for 4 days' work with 3 kettles.

A very good soap is made in Europe from the oil obtained in treating the cakes with sulphide of carbon. Mr. Driess, of Pantin, near Paris, tells me that the cakes coming from the United States contain from 15 to 20 per cent of their weight of oil. When these cakes are used for feeding cattle this oil is not lost, but when the cakes are used as manure this fat is more injurious than profitable to the soil. It is extracted by sulphide of carbon. At Marseilles alone the daily yield from 200,000 kilogrammes of cakes is 20,000 kilogrammes of oil, or for a year of 300 days 6,000,000 of kilogrammes of oil. The sulphide of carbon is re-collected by distillation.

## CLARIFICATION.

The clarification of oils is done by a half saponification transforming nearly all the stearine into a soft soap, and precipitating the coloring matter of the oil along with this soap. The lyes used for that purpose are of a strength of from 18° to 22° Baumé and at a temperature of 90° Centigrade, the quantity varies from 8 to 15 per cent.

## WINTER PRESSED OIL.

The winter pressed oil is manufactured in a very simple way in this country. The refined oil is exposed in winter in large flat vats to the cold air, and very soon the mass becomes solid, resembling tallow. It is then placed in bags and pressed under wooden presses, the oleine runs out, and, deprived of its stearine and margarine, has the property of remaining fluid at a very low temperature. This is used for lubricating purposes. The stearine remaining in the bags is sold at a pretty good price in England.

For the Scientific American.  
ANILINE GREEN FOR WOOL.

BY M. REIMANN

The recent labors of A. W. Hofmann have in some measure solved the question respecting the composition of aniline green.

I shall only take the chief results of these great researches, and then proceed to discuss a new branch of tinctorial industry produced by aniline green.

As is well known, there are two sorts of aniline green. The first is prepared with aldehyd; the second, discovered only three or four years ago by M. Cherpis, a French chemist, is obtained from the so called 'Dahlia violet'. The mode of manufacturing this color is as follows:

Magenta is heated in a sealed apparatus, with a mixture of alcohol and iodide of methyl.

The violet color is as Professor Hofmann has already shown, a salt of the base trimethylia aniline, combined with iodide of methyl, that is to say, iodide of methyl trimethylia aniline.

As there is an excess of iodide of methyl in the apparatus, it is not to be wondered at, that very often two equivalents of the iodide of methyl combine with the base, instead of one, so that the bimethyl iodide of trimethylia-aniline, or iodine green salt, is formed.

The fact that the second equivalent of iodide of methyl is not so firmly combined with the base as the first, explains an observation made some time ago, viz: that a solution of the green salt is changed to violet by heating it at the boiling temperature. One equivalent of iodide of methyl is removed, and the violet salt is formed.

This very circumstance has prevented the employment of aniline green in the dyeing of wool. The wool when dyed in the dyer's bath requires a temperature of 212° F., a temperature which is destructive to the iodine green. Therefore, it was for a long time impossible to dye woolen materials with this green, although silk and cotton goods were dyed by it in the most beautiful shades.

In recent times, however, we have learned how to employ the iodine green, even in the dyeing of wool.

The mordant used for this purpose is the silicate of soda, and it must be noted that in the dyeing operation, the temperature should not exceed 144° to 167° F.

The process is carried out as follows:

The thick solution of silicate of soda, as it is produced in chemical works, is diluted with six times its weight of clear warm water, and well mixed with it.

The wool is well washed, and then introduced into the tepid bath, where it is allowed to remain some hours.

The wool is next taken out of the mordant, and well wrung out, and dried without previous washing.

Meantime the dyeing baths must be prepared. A solution of iodine green, as it is sold by the manufacturers, is poured into a sufficient quantity of water. The bath is then heated to the temperature of 144° F.

The dried wool is moistened with warm water until it has become thoroughly saturated, and is then introduced into the dyeing bath.

It is allowed to remain here one hour, during which time it must be well stirred about.

The wool readily abstracts the coloring matter from the bath, so that after an hour it presents a fine green color, which is visible in the evening as well as by day-light.

If it is desirable to produce a yellow shade, the wool, after it has been immersed in the green bath, must be further immersed in a bath of picric acid, when the bluish-green tint is transformed into a yellowish one.

Lastly, the dyed wool is passed through a weak solution of sulphuric acid and water, and finally washed in a small quantity of clean water.

It must further be observed that the solution of silicate of soda has a concentration of 40° B. This must be diluted with six times its weight of water.

[For the Scientific American.]

## ON OX GALL.

BY C. WIDEMANN.

In the SCIENTIFIC AMERICAN of the 5th of February, I called the attention of readers to albumen. I shall now treat of a product of no less importance in the arts, and which has the same fate as the blood—I mean the ox gall. With the little exception of what is sold to the dyers and curriers, and to a small concern manufacturing a kind of soap to cleanse woolen fabrics from grease, I consider that there is an immense quantity of this article lost.

Ox gall has received abroad a great many useful applications. First let us see of what it is composed, and how its different properties have been applied to industry.

The gall is a greenish liquid secreted by the liver, possessing an alkaline reaction, and producing froth with water, similar in that respect to soap. It has a bitter taste, and is composed mostly of water, a colorless fluid similar to turpentine called "Picromel," margaric acid, a resinous substance, soda, and a few other salts. The margaric acid, the resinous substance, and the soda combine together to form with the picromel a soap, having the property of dissolving fats. Acids render it cloudy; alkalis destroy its gummy appearance. It dissolves freely in water and alcohol. Left to itself it corrupts slowly without emitting the usual putrid odor generated by the corruption of animal substances.

The ox gall varies in color, appearance, and composition, as we said above. The usual color is greenish, but it is also sometimes deep green or light yellow. Its consistency is sometimes sirupy, sometimes very limpid, sometimes cloudy by the presence of a peculiar yellow coloring matter called "cholesterine," easily separated by water.

Taking 800 parts we find the composition to be about:

Water.....	700
Picromel.....	69
Resinous matter.....	15
Yellow coloring matter.....	4 at an average.
Soda.....	4
Phosphate of soda.....	2
Chlorides of sodium and.....	
Chlorides of potassium.....	3.5
Sulphate of Soda.....	0.8
Phosphate of lime.....	1.2
Or in another experiment on 100 parts:	
Carbon.....	63.7
Hydrogen.....	8.9
Azote.....	3.9
Oxygen.....	23.5
	100

It combines with all colors for painting purposes, imparting tenacity and fixing them with intensity, giving them fluidity, but acting also on very light colors to give them a dirty shade when not properly purified.

If a great quantity of gall is collected it can be evaporated to the consistency of an extract, and can be dissolved in an alkaline water when it is to be used. The concentrated gall will keep for years.

To clarify the ox gall and have a perfectly pure product, we recommend the following method:

The ox gall is first boiled and carefully skimmed. To every pint add one ounce finely-powdered alum, boil until the mixture is perfect, then let it cool. Then take the same quantity of ox gall boiled, and skimmed as above, and add one ounce per pint of common salt. It is then left to settle for two or three weeks, decanted, and the two preparations mixed together, which precipitates the cholesterine. It can then be used in painting for the finest miniatures and water colors.

The ox gall possesses also other properties; it fixes the colors on the paper if this paper is passed through its solu-

tion, giving more brilliancy and durability to ultramarine, carmine, green, and all fine colors; combined with gum-arabic it thickens colors without giving them a disagreeable luster, prevents peeling and cracking, and allows other shades to be applied without mixing with that previously applied.

Mixed with lamp-black and gum tragacanth it gives an ink similar in every respect to Indian ink, and can be scented with a little musk or any other perfume.

Passed over pencil, or crayon, or chalk drawings, they may be afterward painted over without difficulty; by passing it over the ivory plates, miniature painters remove the natural oil from the surface and fit them for the reception of the colors. Ox gall can be used for transparent window blinds or screens, as when it is passed over oiled or varnished surfaced colors can then be applied, which colors resist all influences tending to remove them.

The scourers use it by itself to remove fatty matters from wool fabrics, or in combination with spirits of turpentine, alcohol, honey, the yolk of eggs, clay, etc., to cleanse silk fabrics.

The following recipe is the composition of the ox gall soap usually sold:

Six part white soap; one part ox gall; one part potassa; one part alum.

## AMBROSINE—A New Organic Mineral Substance.

A correspondent of the *Rural Carolinian*, Mr. Charles U. Shepard, Sen., Charleston, writes to that paper as follows:

An irregular oval-shaped mass of a mineral, closely resembling amber, has been brought to my notice by Major Edward Willis, of this city; and is here noticed in the hope that an additional supply of the same curious substance may be obtained by our phosphatic explorers. The present mass was originally of the size of a man's fist. It is of a yellowish-brown color externally, but within is clove-brown. It breaks with about the same facility as amber; has a conchoidal fracture, and a resinous luster. It is feebly translucent. Its specific gravity is but slightly above that of water. Indeed, small fragments of it when thrown into water float for a short time, until they part with adhering air, when they slowly descend through the liquid. It is strongly electric by friction. It melts into a clear, yellowish liquid at about 460° Fah.; though it softens at a much lower temperature.

It gives off considerable succinic acid long before it melts. On fusion a dense yellow oil is volatilized, attended with an agreeable balsamic odor, wholly unlike that from the resins of our pines. A dark brown, non-volatile fluid remains behind so long as the melting heat is kept up.

As it differs from any of the oxygenated hydrocarbons known, I have called it Ambrosine—a term compounded from the two words amber and resin; to both of which substances it bears a resemblance. It is very combustible—burning with a bright, yellowish white light, a pleasant odor, and without leaving any carbon, or even the slightest ash behind. It is largely soluble in oil of turpentine, alcohol, ether, and chloroform, as well as in a solution of potash; and is feebly taken up by the strong acids, without suffering decomposition.

It probably originated in some of the coniferous trees that existed during the pleiocene epoch in geology, when our phosphatic formation was in progress of deposition.

## A Case of Spontaneous Combustion.

A Newbern, Va., correspondent of the *Boston Journal of Chemistry* writes:

"A merchant in this place received a box from Baltimore containing, among other things, ordinary bat cotton, and a can of Japan lacquer, or varnish. In transportation the can was broken, and the contents ran out, saturating one or two bats of the cotton. The box was received in the evening, and put in the store at night. When opened the next morning and exposed to the air, the cotton was found to be hot and smoking. The merchant took the precaution to lay it out at the door, when it ignited and blazed up. The cotton might have been taken out of the box the evening it was received, and carelessly laid aside, or it might have ignited before the box was opened; in either event the whole stock of goods would have been destroyed, and several houses in addition. The origin of the fire would, of course, have been attributed to an incendiary. The packing of Japan varnish with combustible articles, I suppose, is frequently done; and is it not well that the public should know the dangerous results that might ensue? I was ignorant of the fact myself, and I suppose others are also, as the box was put up by a reliable house engaged in the drug trade in Baltimore. There was nothing else in the box that could have had any agency in the combustion."

## ACTION OF COMPRESSED AIR IN FRONT OF PROJECTILES.

—Some papers on this subject have recently come before the French Academy; and on the occasion of M. Delaunay remarking on bolides and aerolites, General Morin observed that artillerymen found that in firing over a level near the ground, the dust was raised right and left by the compressed air acted upon by the ball. Ancient cannoners, he said, spoke of valleys as attracting balls, because in such situations the compressed air afforded the greatest obstacle to their passage. In firing along a horizontal wall, and near it, balls deviated, so that if the wall was at the right, the balls went to the left, and vice versa.

TO THE POINT.—Mr. Geo. W. Woodward, the well-known publisher of architectural works, whose advertisement appears in its proper place, in a recent note to us says: "AFTER an expenditure of over twenty-six thousand dollars in advertising, the proof is ample that the SCIENTIFIC AMERICAN is the most profitable medium I have yet employed."