

U. S. Department of Agriculture, Forest Service
FOREST PRODUCTS LABORATORY

In cooperation with the University of Wisconsin

MADISON, WISCONSIN

THE MANUFACTURE OF PAPIER MACHE

720.1039

Published in
PAPER INDUSTRY
November, 1930

THE MANUFACTURE OF PAPIER MACHE

(Various Formulas and Processes)

As its name would indicate, papier mache was originally composed of paper pulp in combination with various earthy substances of both mineral and vegetable origin, held together by glues of different kinds, including rosin soap. The ingredients making up the mass may consist of china clay, chalk, lime, gypsum, barytes, and talc as well as mineral and vegetable coloring substances.

Viscous adhesives are used to form the material into a mass and these may consist of rosin soap, gelatin, casein, starch or corn paste, gum acacia, dextrin, Irish moss, or wax.

To make papier mache a wet paper pulp is ground up in a mill with mineral earths and an agglutinant of the preferred type, coloring matter being also added. Below is a selection of formulas, or as we should say in the language of the papermaker, furnishes for papier mache.

1. Take 750 grams of paper pulp, 1,250 grams of china clay which has been moistened with 2-1/2 liters of water; 750 grams of dry casein and mix. The mixture is heated to the boiling point and stirred to make a paste of uniform consistence.

2. Take 3 liters of water, 750 grams of dry pulp, 1 kilo of kaolin and 250 grams of saponified rosin.

3. Take 1 kilo of paper pulp, 5 liters of water, 750 grams of finely pulverized talc, 750 grams of rye meal, and 250 grams of unslaked lime. The paper pulp is cooked in the water with the rye meal and to this the unslaked lime is presumably added; 500 grams of starch is cooked separately in 8 liters of water and the hot solution added to the mixture previously made. The mixture is then stirred vigorously until a smooth paste results. The mixture is allowed to stand for several days in order to permit any excess water to drain off.

4. Take 500 grams of dry paper pulp, 2 liters of saponified rosin, 500 grams of flour and 500 grams of china clay, or ordinary white earth, and 3 to 4 liters of water. These materials are boiled together to form a smooth paste.

5. Take 500 to 1,000 grams of paper pulp, 750 grams of cheese made from milk from which the cream has been removed (equal to 93 grams of casein), 500 grams of saponified rosin, 125 grams of soda ash, the whole being mixed with 2 liters of water. Boil for three-quarters of an hour and mix in the usual way.

6. Take 1 kilo of sulphite pulp, 250 grams of china clay, to which has been added 3 liters of water, followed by 250 grams of starch which has been previously made into a paste with a liter of water; the mixture is then boiled and rubbed to a mass of uniform consistence. This compound is preferred for the manufacture of architectural ornaments, a strong adhesive being made by soaking 250 grams of glue in 2 liters of water over night and boiling the mixture; casein is prepared by treating 10 parts of dry casein and 1 part of soda ash with 40 parts of water. The addition of 15 percent of boric acid is recommended as a preservative. Casein is preferred to glue because it combines more readily with the rosin and the resulting cement adheres more tenaciously. It is on account of this that casein and rosin play such an important part in the fabrication of papier mache.

The papier mache is molded into different forms according to requirements. The preparation of the plaster of paris molds calls for some care and skill.

Papier Mache Varnishes

Formulas for varnishes or lacquers for papier mache articles are given as follows:

1. 3 parts of shellac, 10 parts of alcohol, and 2 parts of lampblack.
2. 2 parts of shellac, 2 parts of rosin, 10 parts of alcohol, and 3 parts of lampblack.
3. 17 parts of shellac, 9 parts of rosin, 8 parts of dragon's blood, and 100 parts of spirit of turpentine.
4. 10 parts of shellac, 5 parts of gum sandarac, 3 parts of gum mastic, and 100 parts of alcohol.
5. 10 parts of gum sandarac, 3 parts of gum mastic, 2 parts of heavy turpentine, and 50 parts of alcohol; 1 part of safran is used to color 50 parts of alcohol.
6. To make a golden varnish, dissolve 9 parts of shellac and 10 parts of gum gamboge in 50 parts of alcohol.