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Some Painting Problems and the Answers

by F. L. Browne
Senior Chemist, Forest Products Laboratory
Madison, Wisconsin



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THE life of paint is limited to a few years; the coating must be maintained by applying more paint from time to time. From five to six times as much house paint is required for renewal of old coatings as is consumed in the initial painting of new woodwork. Those who make and sell paint are in the habit of thinking of all these paint jobs as separate transactions independent of the jobs that went before or are to come after them. The house owner, to be sure, buys his paint jobs one at a time, but his real interest is in a coating satisfactorily maintained over a long period of years. Much of the misunderstanding and disagreement about paint comes from failure to appreciate that paint maintenance is a long term matter, made up of a succession of paint jobs that must fit together into a harmonious whole.

Paint maintenance is successful when it comes up to reasonable expectations both as to continuance of the chosen decorative effect and as to cost. Owners' expectations, however, vary widely. Some, following tradition of long standing, expect to repaint no more often than intervals of eight or ten years. Others, whose decorative standards may be more exacting, are willing to paint every four or five years. A negligible few may be willing to paint still more often. Practically no one, however, expects ever to be put to the extra expense of completely removing old coating before applying a new one and any maintenance program that leads to such eventuality may be regarded as unsuccessful.

All of the above expectations can be satisfied with good house paints now on the market, but no one kind of paint is capable of satisfying all of them. It is idle, therefore, to attempt to discuss good paint in general terms—we must discuss it with reference to the kind of maintenance program for which it is suitable.

The Cure for Poor Paint

Although the writer has rarely encountered really inferior paints in the cases of paint complaints he has examined, he is told repeatedly by paint manufacturers and others that much inferior paint is made and sold. The Federal Trade Commission and Better Business Bureaus take action against notoriously bad paint from time to time, but they can deal only with paints so inferior in quality that their sale is a downright fraud. Paints that are merely inferior in quality, but not clearly fraudulent can be dealt with effectively only by clearly defining good paint. When the regional lumber manufacturers were preparing their pamphlets on painting instructions for insertion in bundles of bevel siding they found that there is only one kind of good paint defined in such a way that it can be discussed in general recommendations. That paint is pure white lead, commonly known as lead and oil. Other kinds of good paint are identified for sale by trade brand only, vary widely in composition, but conform to no standards by means of which the various kinds and grades can be recognized by the users.

The Forest Products Laboratory has recently shown that it is perfectly practicable to define good paints of all kinds in such a way that they can be set apart from inferior paints. In fact, it is technically feasible to classify paints in a logical manner. The proposed "grading" rules, though technical in nature, are much simpler than the various grading rules for lumber. While some technologists of the paint industry recognize the desirability of classifying paints, the paint industry has not adopted it.

"Moisture" Failures and Their Cure

Access to moisture behind painted woodwork is the cause of one large class of early paint failures. The moisture may get in through carelessly designed or erected joints in the construction, or by condensation of moisture laden air from inside of the house when it comes in contact with the cold back surfaces of the exterior woodwork. Trouble from condensation has probably increased materially in recent years because of the greater use of thermal insulation, which makes the back surfaces of exterior woodwork colder by letting heat escape from inside, and because of provision of air washing and humidification in modern heating plants. Condensation of this kind is more troublesome in the northern parts of the country, but in more southern areas where studs are sometimes covered with drop siding without sheathing and heating is accomplished with inadequately vented open gas burners, condensation on or in the sidewalls or under the roof sometimes occurs as a result of the large amount of moisture formed in the combustion of gas.

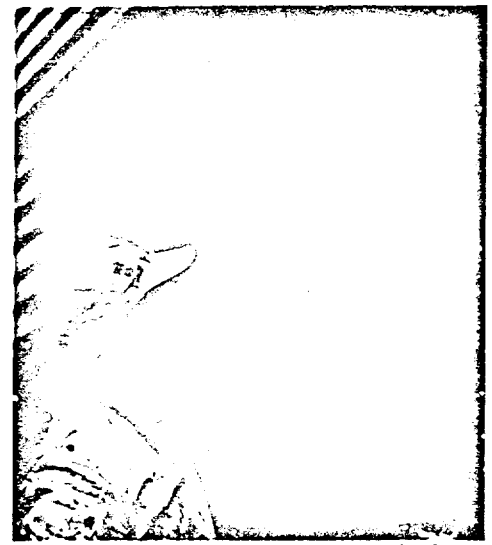
Condensation in sidewalls and attics can be prevented by keeping moisture from passing through the walls. This can be accomplished by the correct installation of vapor barriers on the *inside* of the studs and *underside* of attic floor joists. In houses already erected two coats of aluminum paint on the interior surfaces of the walls and ceilings under the attic make an effective vapor barrier over which other wall decoration may be applied. Where moisture arises from open gas burners it should be carried off by means of adequate flues.

Much moisture is evaporated in houses during normal living operations such as cooking, bathing, laundry work, and the breathing of persons and plants. Families undoubtedly vary in their living habits that affect the amount of moisture evaporated and the amount that can subsequently escape when the house is ventilated by opening windows. House owners should be taught that condensation on windows is an indication that the relative humidity indoors is higher than the house can carry safely with the prevailing temperature out of doors and that reduction of relative humidity by opening windows and adjustment of the heating plant is desirable until the condensation is re-evaporated. In northern climates storm windows are necessary, whether or not the windows are weatherstripped, both to save heating expense and to prevent condensation without limiting the house to unreasonably low relative humidity during cold weather.

Fortunately the problems of moisture leakage and condensation are becoming generally appreciated and at least for new houses and some of those already erected, we now have effective means of keeping the woodwork dry. To be sure there remains the serious undertaking of educating those concerned with the erection of houses and the house owners themselves, but there are reasonable grounds for believing that in time moisture as a large cause of unsuccessful paint maintenance can be eliminated.

The Cure for Mistakes in Applying Paint

Much unsuccessful painting comes from faulty technique in applying paint. The most common blunders arise from the painter's very human desire to do the work with the smallest amount of expensive material possible. In some cases in which the limits of safety are overstepped the painter was not intentionally dishonest, he was merely mistaken in his judgment or unfamiliar with the limitations of the material with which he was working. It should be remembered that the painter's judgment is necessarily based on insufficient information because, except in the case of lead and oil, he does not have practical knowledge of the composition of the paint he is using, and there are no generally accepted standards of correct application. Commercial paints differ in composition far too widely to conform to any general standards of application, and since they are not recognized by classes, each paint presents a separate problem in application. Often the painter is asked to apply a paint that came on the market long after he learned his craft and differs seriously as respects application from anything he has been trained to use correctly.



Harvey Gunderson

● If the paint job (particularly the repaint job) goes wrong, don't blame it all on the painter. "More complaints about paint jobs are caused by incorrect programs of maintenance than by poor lumber, poor paint, bad application, or moisture." The main thing is a sensible program of maintenance.

To be sure, directions for application are usually printed on the label on paint containers. The painter is often chided for paying little attention to such directions, but when manufacturers' directions are studied carefully in relation to the composition of their products it becomes clear at once that manufacturers' ideas of correct application are just as divergent and illogical as painters' practices.

The Cure for Mistakes in Paint Maintenance

In the writer's experience most complaints about paint jobs are caused by incorrect programs of maintenance than by poor lumber, poor paint, bad application, or moisture. Neither the paint manufacturer nor the painter, as a rule, has much control over maintenance, because the house owner (or his agent) generally decides when painting shall be done, how much work he is willing to pay for, and often what brand of paint shall be used. Efforts to attain more successful paint maintenance, therefore, must take into account the necessity of teaching house owners how to space jobs correctly and how to choose the right kinds of paints for their purposes.

Many house owners have no definite plan for spacing paint jobs, and merely wait until the old coating goes to pieces before trying to renew it. In this group many have no intention of painting more often than every eight or ten years. Since we have no white paints that can be relied upon to remain durable for such long periods, those who follow such programs are more inter-

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ested in the ability of the paint to stand neglect well than they are in its durability. They want a soft type of paint that breaks up slowly by crumbling so that it does not look too unkempt during the period of neglect and after neglect can be safely repainted without expensive removal of the old coating. Pure white lead paint, if used exclusively, will behave in this way, and is largely responsible for the fact that so many owners are accustomed to maintenance programs involving long periods of neglect.

MOST of the newer paints, however, are made to provide greater durability and superior appearance, which can be provided only by making harder paints that break up finally by cracking, curling, and flaking, and therefore cannot be neglected safely. Of course, practically all paints are advertised as wearing away slowly by chalking, leaving a fine surface for repainting, and avoiding the defects of cracking and scaling, but such claims are made on the assumption that repainting will be done before the end of the period of durability and before neglect begins; they do not mean that the paint is suitable for those who expect to let their coatings go through periods of neglect.

There are two ways of successfully linking together the maintenance program and the kind of paint for those with unduly long intervals between painting. One way is to convince the house owner that it will be worth his while to change his program to permit him to use paints of harder type satisfactorily. The other way is to sell him the kind of paint that will serve satisfactorily in the program to which he is accustomed. To persuade him to buy a paint unsuited to the program he intends to follow, however, is simply to add one more to the number of those who are dissatisfied.

A large proportion of paint complaints that come to the writer's attention occur on houses that have been painted at reasonable intervals with good paints well applied on woodwork that remains dry and yet the paint fails far too soon and often in a manner not characteristic of the normal behavior of the paint last used. In all these cases, however, two or more paints of distinctly different composition have been used for successive paint jobs or successive coats in the same paint job. Some of the combinations show up repeatedly in different complaints. Some well known combinations frequently occurring in complaints are white paints over yellow ochre primer or paint, almost any house paint over clear varnish, and white paints over full color paints like deep red, brown, green, or black. Unfortunately technical exposure tests in the past have been confined chiefly to initial paint jobs or repainting with the same kind of paint, but some past records of tests involving combinations of paints differing in type have been discovered, the outcome of which reveals the same abnormalities of behavior found when these combinations of paints are seen on houses.

The evidence that good paints are not all compatible with one another is now conclusive, but there is much difference of opinion about the seriousness of the problem. Some hold that incompatibility occurs only in a few extreme cases such as those named in the preceding paragraph. The writer believes, on the basis of both observations of houses and of technical exposure tests, that the principle of incompatibility is very much more far reaching. Combinations of white paints, differing materially in content of zinc oxide, for example, have been observed to deteriorate more rapidly and in a less satisfactory manner than corresponding coats made up entirely of either one of the paints separately. A great deal of research will be necessary to establish all of the ramifications of the principle of compatibility, but when it has been done many of the present mysteries of house paint maintenance will be cleared up. A large proportion of the Forest Products Laboratory's research on painting is now directed toward this problem.

Until future technical study discloses the extent to which paints may differ in composition and still remain compatible, the conservative practice in maintenance is to start out with a good paint when the woodwork is new and thereafter maintain it at proper intervals with paint of essentially the same composition. Switching from one kind of paint to another is doubtful practice unless the particular combination so produced has been tested or found satisfactory by previous experience. Certainly those combinations of paints that have frequently led to difficulty should be avoided. At the present time the only white paint that is used consistently by large numbers of house owners is pure white lead because it is the only paint recognized by type as well as by manufacturer's brand. In the writer's opinion the high regard in which white lead paint is held by so many good painters and paint users is due largely to this consistency in its use. When white lead is applied over paints of other kinds it often fails prematurely and in an abnormal manner, indicating that it is just as subject to the requirement of compatibility with previous paints as are paints of other kinds.

The Need of Classification of Paints

The cure for bad programs of paint maintenance, therefore, lies in a classification of paints that will make it possible to teach house owners how to buy the right kinds of good paint for their purposes and how to get out of the paints they buy the good service of which they are capable.

Consideration of the causes of unsuccessful paint maintenance and consequent loss of public confidence in painted exterior woodwork shows that our most serious troubles have come not so much from jerry building and inferior paint as from efforts to improve building methods and paints that have made the situation more complicated and unduly technical for craftsmen and laymen. Thermal insulation and modern heating plants are distinct improvements over past practices but, unless appropriate precautions are taken to control condensation on cold parts of the structure, they tend to increase the number of houses in which moisture leads to early paint failures and other difficulties. In a similar way modern developments in paint have given us better paints than we ever had before, but there are now so many kinds of good paint on the market and they vary so much in composition, manner of correct application, and compatibility with one another that painters and house owners do not know how to use them all correctly. Merely offering the public good paints that are capable of giving successful service is not enough to re-establish confidence in painted woodwork unless we likewise make it possible for each good paint to be so applied and maintained that it will give the good service of which it is capable. To accomplish that purpose the technical considerations of application and maintenance must be simplified sufficiently to bring them within the comprehension of craftsmen and house owners.