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REPAINTING THE PAINT- NEGLECTED HOUSE

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REPAINTING THE PAINT-NEGLECTED HOUSE

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On many of the houses that the painter is asked to repaint the old coating wore out 3 or 4 years previously and was left in a state of paint neglect. If the old paint was one that stands neglect well the surface can be prepared for the new job fairly easily. Many paints, however, do not stand neglect well; if the old paint was one of them the painter may have a difficult problem on his hands. He knows that the safe course is to burn off the old coating entirely but if he bids on that basis he may lose the job to a less scrupulous competitor who plans merely to slap on some new paint and trust to luck that it will hang on for a time. On the other hand if he follows his competitor's methods and the job goes bad he may seriously damage a fine reputation that he has taken years to build up. The painter who is going to get the business this year and get it again 4 or 5 years from now must learn to distinguish between the surfaces that can be trusted to hold new paint properly and those that it will be good business to concede to his competitors when the owner cannot be convinced of the need for proper preparation before repainting.

Modern types of paint add to the painter's difficulty when maintenance has been neglected. In former times most residential painting was done with a paint of a relatively soft type whose outstanding merit is the ability to stand neglect well. During the prosperous period following the World War popular choice shifted very decidedly away from the soft type of paint toward harder types that have certain important advantages during the useful life of the coating but unfortunately do not stand neglect well. These paints were designed for an age in which better performance during 4 or 5 years of useful life could be demanded at the sacrifice of good behavior during a period of neglect because it was believed that nearly everyone would be able to repaint before the coatings disintegrated. Like other enthusiasms of easy times this optimism has led us into serious difficulties when hard times arrived. Many of these paints have not been renewed at the proper time and their badly neglected surfaces leave the painter uncertain about the outcome if he merely scrapes off the loose edges and repaints without burning off all of the old coating.

A survey of one of the residential sections of a city in the Middle West provided the photographs with which this article is illustrated and shows the variety of paint-neglected surfaces with which the painters

of that city must contend. The houses shown were selected at random in a community in which as a rule the occupant is the owner and the painting is done by local contractors. Past experience has taught the writer that under such conditions it is rarely possible to obtain accurate information about the painting history of a house. Even the owner's or the painter's statement of the date and kind of paint used at the last painting often proves incorrect. That, however, is exactly the situation that the painter meets when he bids on a new job. He must rely primarily upon his own examination of the surface and knowledge of paint behavior to determine those facts about the past painting necessary for guiding his procedure in repainting. We can therefore examine these photographs much as a painter should examine a house that he is going to repaint.

House No. 1

House No. 1 has always been painted with the old-fashioned soft type of paint but no new paint has been applied for 7 or 8 years and the surface has become badly neglected. The coating has thoroughly disintegrated. From a distance it merely looks shabby but close inspection proves that it has crumbled badly and has left considerable areas of wood entirely bare. Still closer observation with a magnifying glass demonstrates that disintegration of the coating developed from checking, which is characteristic of the soft type of paint. When the paint "checks" finally penetrated through the coating to the wood some of the little "islands" of coating thus cut off became dislodged one by one, leaving the wood bare underneath. Many painters call this kind of disintegration "chalking" but, although the paint has been chalking for a long time, the failure really develops from checking and crumbling.

The painter who gets the job of repainting House No. 1 is lucky because he has very little to worry about. After any necessary carpenter's repairs have been attended to the painter need merely dust off loose chalk and dirt, perhaps clean a few places where soot or grease from oil-burning furnaces has collected on shaded parts of the building, and he is ready to brush on new paint. Two coats of new paint are necessary, of course, because part of the wood surface has been left bare and what is left of the old coating is little more than a mass of porous pigment that will absorb much oil from the first coat of new paint.

As a rule the new paint should be of the same soft type previously used on House No. 1 because the chances are that the job will again pass through a long period of neglect before it is repainted. If, however, the owner feels that in future he will repaint before the coating disintegrates badly and wishes to enjoy the advantages of harder types of paint it is practicable to apply them over this surface. The first coat of new paint should be thinned with linseed oil and relatively little turpentine or other volatile thinner, using not more than 1-1/4 gallons of total liquid to 1 gallon of soft paste paint. At least a gallon of the mixture should be

applied for each 600 square feet of surface. For the finish coat a gallon of soft paste paint should be thinned with not more than 1 gallon of liquid, mostly linseed oil, and a gallon of the mixture applied for each 600 or 700 square feet of surface.

House No. 2

House No. 2 has been painted and two or three times repainted with paints of a fairly hard type but the owner waits just a little too long each time before he calls in the painter. As a result the painter each time has a difficult surface to deal with and as time passes successive repaintings are proving less durable. The paint is in a more advanced stage of disintegration than that on House No. 1, yet the last painting of House No. 2 was 2 or 3 years more recent than that on No. 1. The break-up of the coating on House No. 2 is easily observable from the opposite side of the street. Closer inspection shows that it is disintegrating by flaking and scaling rather than by crumbling. The view through a magnifying glass shows how such behavior differs from the crumbling on House No. 1. Note that flaking does not develop from checking but from an entirely different kind of fissure in the coating, cracking, which is a much larger and more conspicuous sort of break-up. At the edges of the cracks the coating curls upward and eventually falls off, leaving a patch of bare wood, and the coating still clinging to the wood has jagged and insecurely adhering edges.

For a really first-class job the old paint on House No. 2 should be burned off completely but it is highly improbable that the owner will pay for it this year. If all loosened edges of old paint are carefully removed with putty knife, wire brush, and sandpaper a fairly good job of repainting can be done with reasonable assurance that it will stand up for about 3 years but probably no longer. The owner should be warned, however, that the new paint will not form a perfectly smooth coating because the places where the old coating has flaked off will show as hollows in the new one. He should also be warned that continuance of his practice of allowing the coating to get into this condition before repainting will eventually make a complete burn-off necessary before repainting can be done at all satisfactorily.

In repainting over this old coating the painter should use a hard type of paint, preferably the same paint that was used previously. If a soft type of paint is applied there is danger of conspicuous alligatoring developing within a year or two. The paint should be a real oil paint; it should contain no heat-treated oils or varnishes that tend to give enamel-like consistency to paint. A real oil paint properly mixed will show brush marks but it will fill the flaked patches better and more nearly conceal them than a paint containing oils treated to give quick drying or freedom from brush marks.

Two coats of new paint should be applied. The reduction of the first coat is necessarily a compromise between the needs of the patches of

bare wood and those of the remnants of old coating, which are much less absorptive than the old coating on House No. 1. Without knowing the composition of the paint to be used it is not possible to make specific suggestions for thinning, but in general the paint should be mixed so that it will contain more pigment and the liquid portion a higher proportion of turpentine than was recommended for House No. 1. In applying the first coat of new paint a good plan is to lay off a stretch of paint and then, after the oil has had just time enough to sink into the wood of the bare patches, go back over the stretch without dipping the brush in the paint bucket. In that way much of the paint will be transferred from the poorly absorptive coated patches to the much more absorptive bare patches and the final result will be a more nearly level coating with the old flaked places showing less conspicuously.

In examining houses before bidding for their repainting the painter should look constantly for signs of failure of the old coating caused by moisture behind the painted boards. On houses afflicted with this faulty condition the best of paints may fail conspicuously in a very short time, often in less than a year. The wise painter will call the owner's attention to moisture failures before undertaking the job of repainting. If he waits until his own repaint job has failed, as it probably will, he will usually find it very difficult to convince the owner that the failure came from conditions beyond the painter's control.

The various ways in which moisture gets into the side walls of houses and ruins fine paint jobs are discussed in a mimeograph obtainable free from the Forest Products Laboratory, Madison, Wisconsin. Houses that are chronically subject to such conditions cannot be repainted with assurance of success even if the old coating is burned off entirely. The source of moisture must be discovered and means taken to keep the side walls dry before paint can be expected to give good service on such houses. For his own protection the painter before agreeing to repaint the house should warn the owner that moisture collects at times behind some of the painted woodwork and may cause difficulty with the new paint job if means are not found to keep the wood dry.

Some of the forms of paint failure that should lead the painter to question whether the woodwork always remains dry can be described by considering specific examples from the writer's experience.

House No. 3

The condition of blistering observable on House No. 3 is an unmistakable sign of moisture in the side walls. If a board of siding is removed while such blisters are swollen the back of the board will be found thoroughly wet. A carpenter can easily remove a board of siding for such examination and replace it without damage if it is necessary to convince the owner that there is moisture behind the boards. As a rule that condition is

found most often in late winter or early spring (House No. 3 was examined in March). Later in the season the side walls may dry out again and the blistered parts of the coating become flabby or even sink back almost to their original position so that the blisters may become hard to detect. While in the turgid state a penknife thrust into the blister may show it to be full of water but that is not always the case. When the blister is peeled off it may reveal the bare wood beneath or it may reveal a prior coat of paint still clinging to the wood.

Blisters may break and peel soon after they are formed but very often they merely dry out and shrink back until the coating becomes more brittle as a result of weathering for a few months longer, after which the blistered areas crack open and scale off. House No. 3 shows places where the previous paint job had blistered and subsequently scaled. The present coating was put on only a year or so ago and is still soft and flexible, yet it is already cracking and coming loose. The painter should recognize this house at once as a "chronic peeler" and should not undertake to repaint it even if he burns off the old coating entirely unless the owner understands that the paint cannot be expected to give good service until proper steps have been taken to keep moisture from getting behind the painted boards.

Blistering Reproduced in the Laboratory

The Forest Products Laboratory has equipment for reproducing typical moisture failures of paint for the purpose of studying the effects of different woods and paints. The panel shown in the illustration was made of 4-inch red cedar siding of the kind used on houses. It was painted in October 1934 with three coats of a representative house paint of the titanox, lead and zinc type. On the left-hand half of the panel the paint liquid contained pure linseed oil but on the right-hand half a mixture of linseed oil and heat-treated tung oil was used. The panel was exposed to the weather facing south at 45° for 2-1/2 months, after which it was tested on the blistering apparatus. The apparatus consists in a wooden framework to which panels are attached as though they were the side walls of a house. The miniature "house" has a roof and a floor and inside there is a large pan of water that is heated electrically to provide heat and humidification. The "house" is placed in a large cold-room kept at 40° F. The temperature within the house was approximately 80° F. Under such conditions moisture condensed on the backs of the boards of siding, making them thoroughly wet.

Blisters began to appear on the top board of the panel shown after the "house" was in operation for 1 day. After 2 days blisters appeared on the second and third boards also and after 3 days they appeared on the fifth board. One photograph was taken after 11 days, when the panel was removed from the "house" and replaced on the test fence out of doors. The other photograph was taken 8 months later when the coating was beginning to fail by scaling.

House No. 4

The sort of scaling of the old coating to be seen on House No. 4 is commonly the result of wet side walls but it must not be confused with some of the results of painting with incompatible paints that will be discussed subsequently. House No. 4 is one of nearly 200 houses in a single community that have been "chronic peelers" ever since development of the plat began some 7 years ago. This house had been painted three times within 2 years when the photograph was taken, each job failing in much the same way. Some houses were burned off and repainted and still failed promptly in the same way. Examination of the houses showed that the backs of the boards of siding and the building paper behind them become thoroughly wet every winter. The writer knows of no way in which these houses can be kept properly painted at reasonable cost until construction practices in the community are altered in such a way as to keep the side walls dry at all times.

House No. 5

House No. 5 is an old house to which additions have been made from time to time. There apparently had been no great trouble with the paint until the last alteration was made some 8 or 9 years ago. Since then it has been necessary to repaint at yearly or biyearly intervals and a very thick coating has been built up except on patches here and there where scaling took place before the last repainting. In 1934 the side walls were filled with insulation, which in this case seems to have increased the condensation of moisture behind the siding. All over the house the thick paint is cracking badly as shown in the photograph, and under the porch on the south side the coating is now scaling very badly. At the time the photograph was taken the moisture content of the boards was 30 to 40 percent, that is, they were thoroughly wet.

House No. 6

House No. 6 was erected in 1919 and painted with pure white lead paint, which gave entirely satisfactory service. In 1926 it was repainted with white lead paint. During the following winter the outlet to the sewer became clogged and caused water to run back through the cellar floor drain, partly flooding the cellar floor. The difficulty was not properly repaired until the ground thawed in the spring, when it was less difficult to uncover the connection to the sewer. The photograph was taken in May 1927, nine months after painting.

In this case there was comparatively little blistering because pure white lead paint is distinctly more resistant to blistering than most other kinds of paint. The siding, however, was redwood, a wood that holds paint excellently but one that contains colored substances soluble in water that turn dark reddish-brown in color when exposed to air. When the boards became wet the water carrying the soluble matter exuded through the paint, smeared over the surface, and developed the dark stains as shown. Under similar circumstances somewhat similar stains may appear over western red cedar and on at least one house the writer has seen them on white pine. Such discoloration of paint with water soluble material from the wood is unmistakable proof that the wood became thoroughly wet after the house was built. The fact that some woods discolor paint under such conditions should be no objection to their use in exterior construction because no wood will hold paint properly unless the faulty moisture conditions are removed. The discoloration gives warning of the need of corrective measures.

House No. 6 was washed and repainted in 1927 after the plumbing had been repaired. No subsequent difficulty with the paint has been reported.

Painters today have more good paints from which to choose than they have ever had before. While this variety of products helps the painter who understands them all to suit the needs of clients with different service conditions, different habits of paint maintenance, and different standards of satisfactory paint service, it likewise adds to his difficulties by increasing the chances of premature failure of his repaint jobs because of incompatibility of the new paint with the old one. There is no one kind of paint that can be applied over all other kinds of paint with assurance that it will perform properly. Certain combinations of paints, all of which may be good paints, result in early and conspicuous failures that can be set right only by burning off all of the paint and starting over again from the bare wood.

The typical dwelling may be painted 10 or 15 times in the course of its life in service. Unfortunately many property owners think that these 10 or 15 paint jobs can be considered quite independently of one another, each one to be decided upon when it comes due without regard for the others. Such a course often leads to a succession of unsatisfactory paint jobs ending with an expensive burn-off and serious damage to the reputation of the last two or three painters. Knowledge of incompatible paint combinations is essential for the painter who counts good will among the assets of his business.

The remaining houses in our survey of a middle western city illustrate common cases of failure due to incompatibility of paints. The first two of them, Houses Nos. 7 and 8, should be compared particularly with Houses Nos. 4 and 5 because there is such a close resemblance between failures from incompatibility and failures from wet side walls that the two are frequently confused. It is bad enough to have an honest job fail but when it does the painter gains nothing by attributing the failure to moisture only to have his client discover that the side walls were never wet.

House No. 7

House No. 7 was painted when erected in 1928 with two coats of a dark gray paint, probably of a lead and zinc type, and a finish coat of a dark brown paint. The house was sold to a purchaser who disliked the dark color. In 1932 there was some scaling of paint on parts of the house and a few typical moisture blisters, such as those on House No. 3, were observed. The scaling was therefore attributed to moisture in the side walls but the source of moisture and means of excluding it were not discovered. The house was repainted with white paint of the titanox, lead and zinc type. The photograph was taken in March 1935. The moisture content of the boards from which the paint is scaling was found to be 11 percent, which is perfectly normal and indicates that the boards were not wet during the past winter. On the opposite side of the house where blisters were observed before and after the application of the white paint a few boards were found with 20 percent of moisture but there was very little scaling of paint on any of the moist boards. On those patches where the brown paint had scaled before the white paint was applied the coating is now in excellent condition. Where the scaling occurs the white and brown paints come off together but the gray paint of the initial paint job remains intact.

Although some doubt may be admitted as to a possible part played by moisture in the paint failure on House No. 7, the sandwiching of a dark brown paint between a tinted white paint and a white paint makes an incompatible combination that is certainly the primary cause of difficulty in this case. To repaint without burning off all of the old paint is to invite further disappointment.

House No. 8

The failure on House No. 8 bears a striking resemblance to moisture failure like that on House No. 3, but the house was examined carefully for moisture in March and the boards found to contain slightly less than 11 percent. Four boards were removed and observed to detect signs of water on the backs of the boards, rust at the nail holes, or rumpling of the building paper behind them. Apparently the side walls have never been wet.

House No. 8 was completed late in 1929 and a primer coat of paint applied. In June 1930 the painting was completed with what the owner understood to be lead and oil but on examination proved to be a mixed pigment paint, probably of the lead and zinc type. In July 1933 the owner contracted to have the house repainted with one coat of lead and oil but the painter purchased a so-called quick drying house paint in which the liquid contains a mixture of linseed oil and heat-treated tung oil and the pigment contains titanox, white lead, and zinc oxide. The painter began on the north side of the house but had so much trouble picking up his laps with the quick drying paint that he reduced 100 pounds of soft paste white lead and mixed it with 5 gallons of the quick drying paint to complete the job.

Paint scaling began within a year. The photograph was taken in March 1935. There is scaling on all sides of the house but it is distinctly worse on the north side than elsewhere. The quick drying paint is a well-made product put out by a responsible manufacturer and will give excellent service over a proper foundation but it differs so markedly from the paint used previously that the combination failed very early. The failure should not be considered a fault of either the old or the new paint but a mistake in using the one over the other. The painter, however, is badly compromised in any case because he used a paint other than the one specified in the contract.

House No. 8 must be burned off before it can be repainted with reasonable assurance of a durable coating.

House No. 9

House No. 9 is an old one that has been painted at least six times. On three sides the paint is failing very badly but on the east side, which is as fully exposed to the weather as any of the others, the paint is in such excellent condition that one repaint coat should prove sufficient. About 10 years ago a fire in the house made it necessary to rebuild the east wall but left the other three walls undamaged.

Examination of the old coating shows that the house was painted initially with a dark reddish-brown paint, then successively with a paint of the color of yellow ochre, a dark gray paint, and at least three times with white paint. The east side has only the three jobs of white paint. The yellow paint may have been compatible with the brown paint but the gray paint and the white paints were not. Painters have repeatedly struggled to repaint these three sides of the house smoothly with less success and less durable jobs each time. The east side, however, has never presented any difficulty. Now the three sides with incompatible coatings must be burned off before they can be painted at all smoothly.

House No. 10

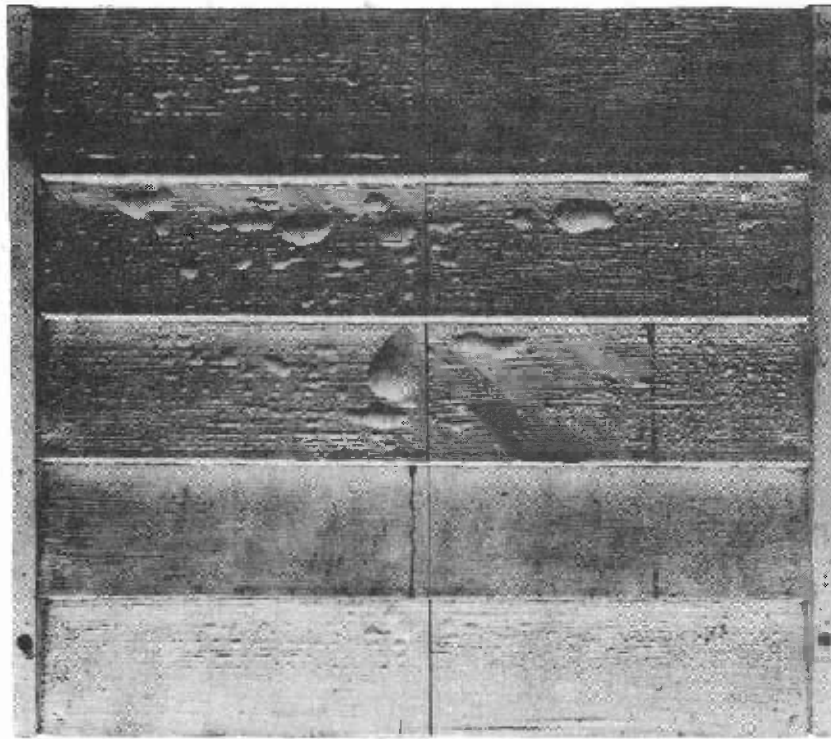
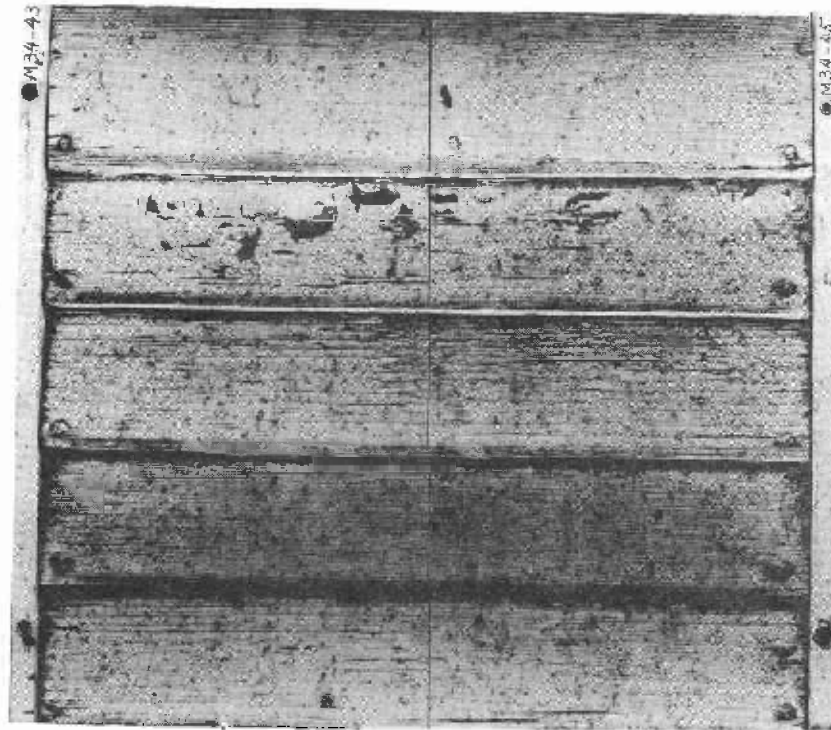
House No. 10 was painted initially with a white paint of the lead and zinc type and then repainted some years later with white paint of the titanox, lead and zinc type. The second paint probably was mixed with a materially higher proportion of pigment than the first, as is commonly the case in manufacturing paints of these two types. The failure takes place by scaling of the second paint, leaving the first paint still firmly adhering to the wood. Successive coats of paint should, as a rule, contain decreasing proportions of pigment. Violation of this principle probably accounts for the unsatisfactory form of failure on House No. 10.

House No. 11

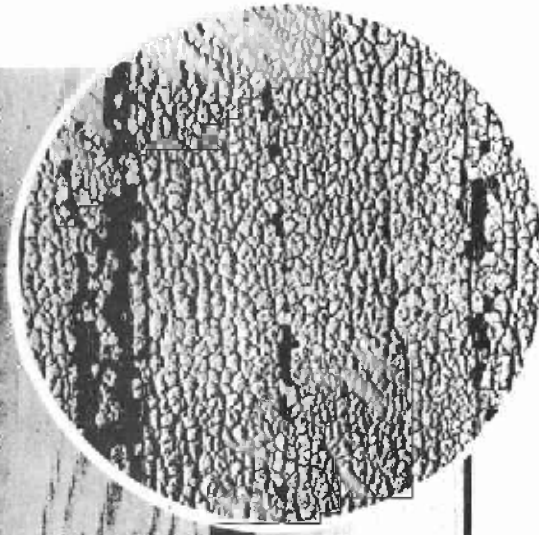
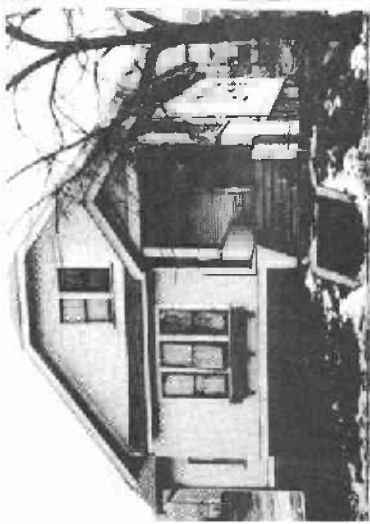
House No. 11 is another example of white paint applied over paint of dark color with which it is incompatible. The incompatibility, however, is more pronounced, appeared after fewer repaintings, and presents a more characteristic form of failure than House No. 9, where the yellow and gray paints perhaps effected a more gradual transition from the dark brown to the white paints. Paint failures of the kind seen on House No. 11 have been common in recent years on the freight stations and other wooden buildings of many railroads. They were formerly painted with red "freight-car" paint for economy in maintenance but were repainted with a more cheerful color chosen to represent the railroad for advertising purposes. The brighter paint often proved incompatible with the red.

House No. 12

House No. 12 was painted about 7 years ago with a white paint of the lead and zinc type and again 3 years ago with pure white lead paint. The conspicuous alligatoring that has now developed is very objectionable to the owner. The writer has repeatedly observed it on houses where white lead has been applied over other kinds of white paint and has reproduced it by painting panels in that way on test fences. Mixed pigment paints can usually be applied with safety over white lead paint but many cases of coarse alligatoring occur when white lead paint is applied over paints that contain zinc oxide.

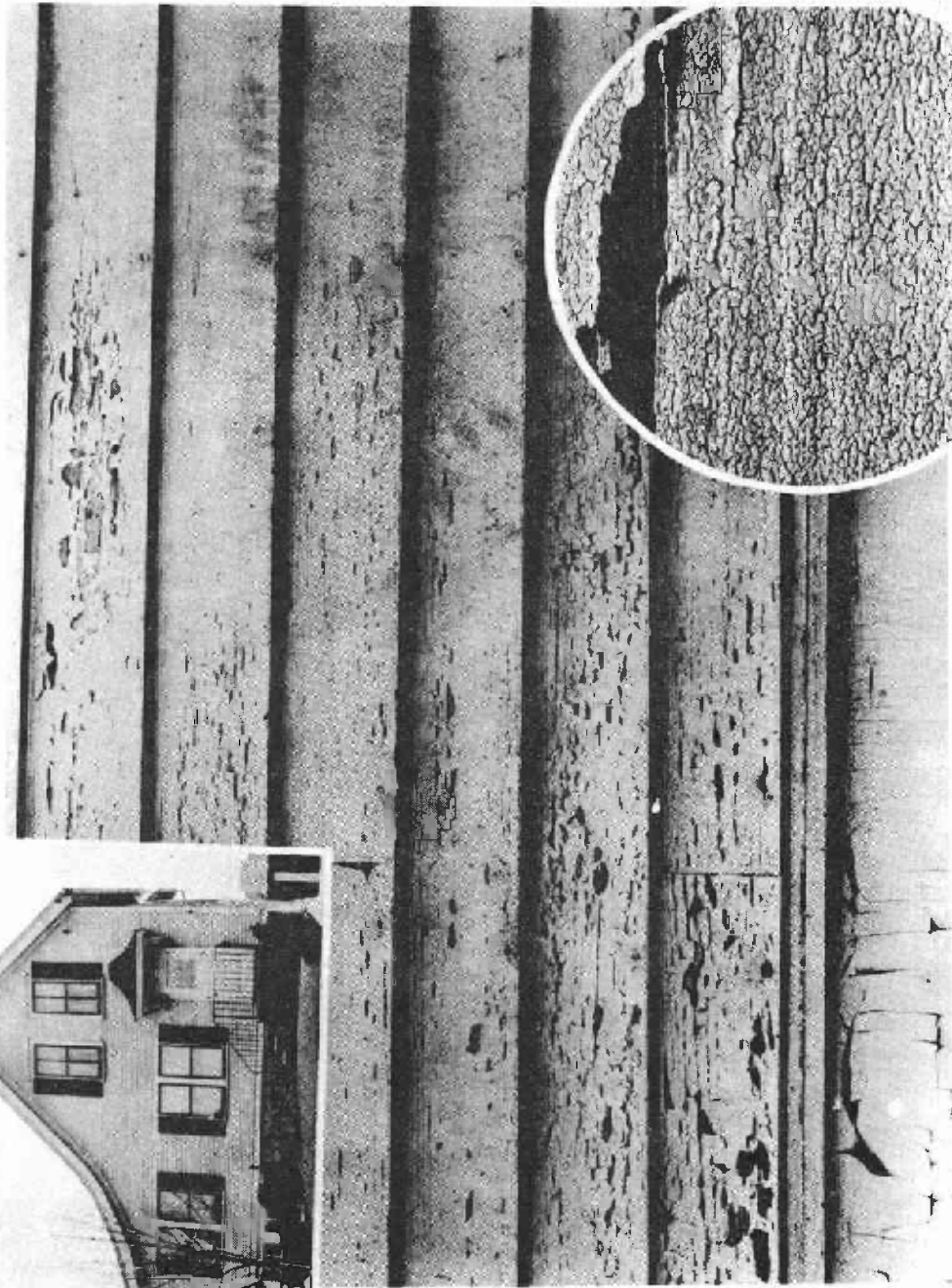
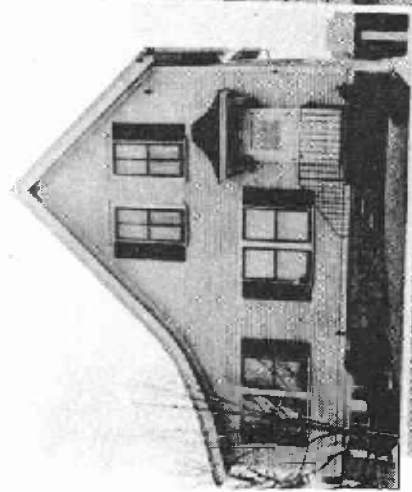


z M 31269 r Blistering reproduced in tests in Forest Products Laboratory.

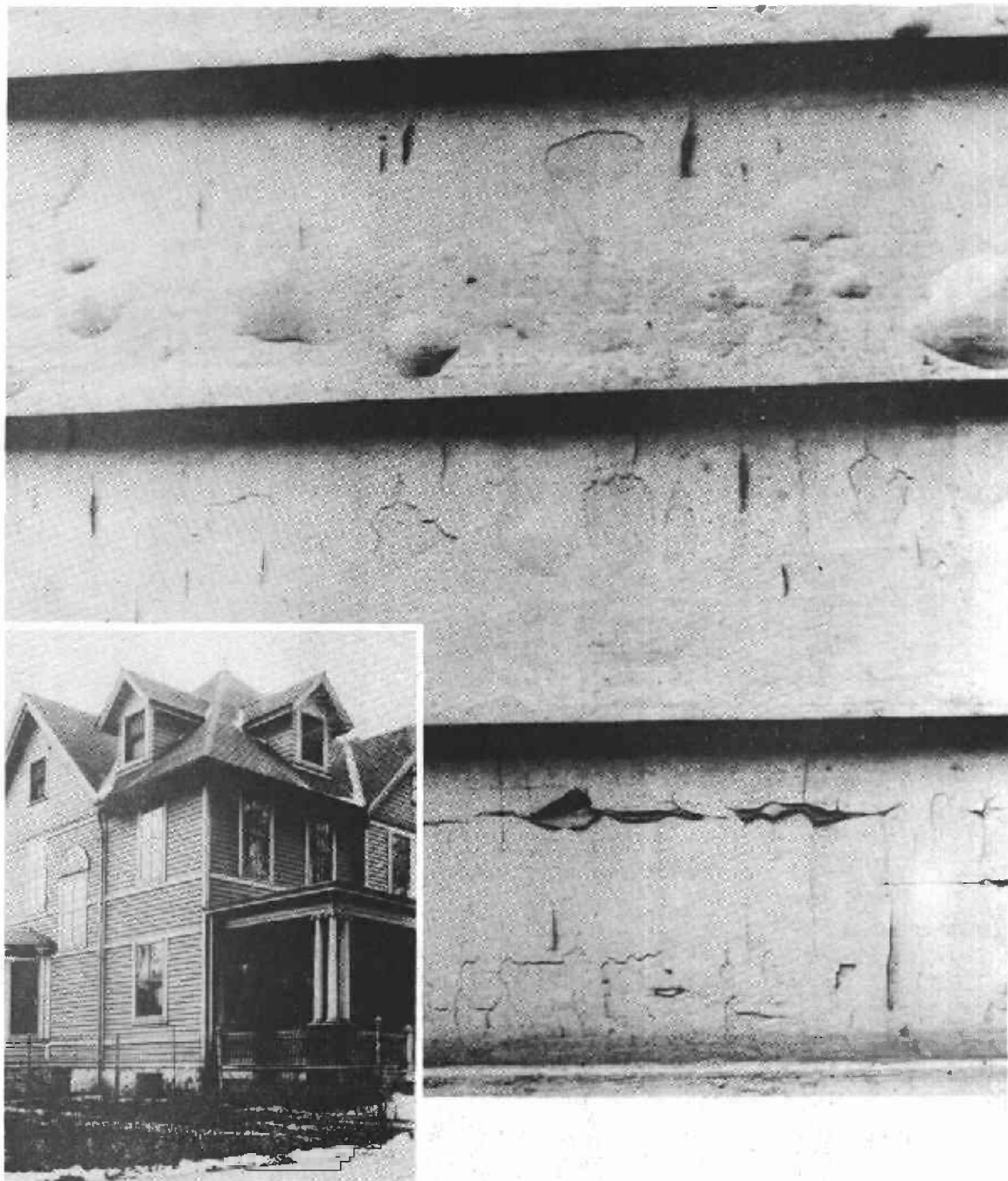


House No. 1.--From across the street the paint merely looks rather shabby. A close view shows that the coating is worn down to bare wood in many places. Through a magnifying glass it is seen that the coating is disintegrating by checking and crumbling.

ZM 26259 F



House No. 2.--Even from across the street it can be seen that the coating is disintegrating. A close view shows how the coating comes loose from the wood in rather large and conspicuous flakes. Through a magnifying glass it can be seen that the coating disintegrates by cracking, curling, and flaking.



A CHRONIC CASE OF MOISTURE BLISTERING

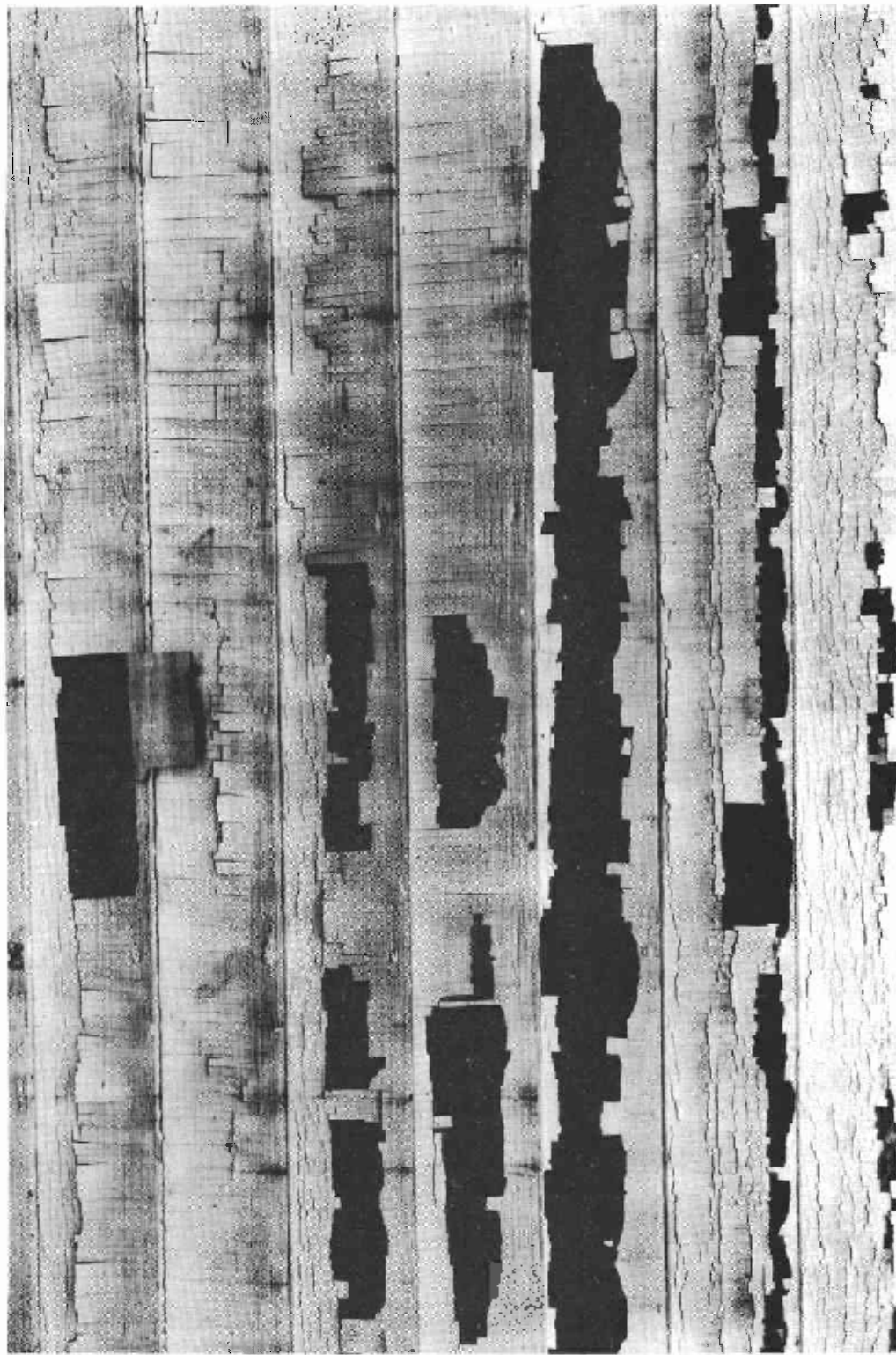
Not only has the last paint applied developed blisters, but places where the previous paint job blistered and peeled are clearly evident.

ZM26258F



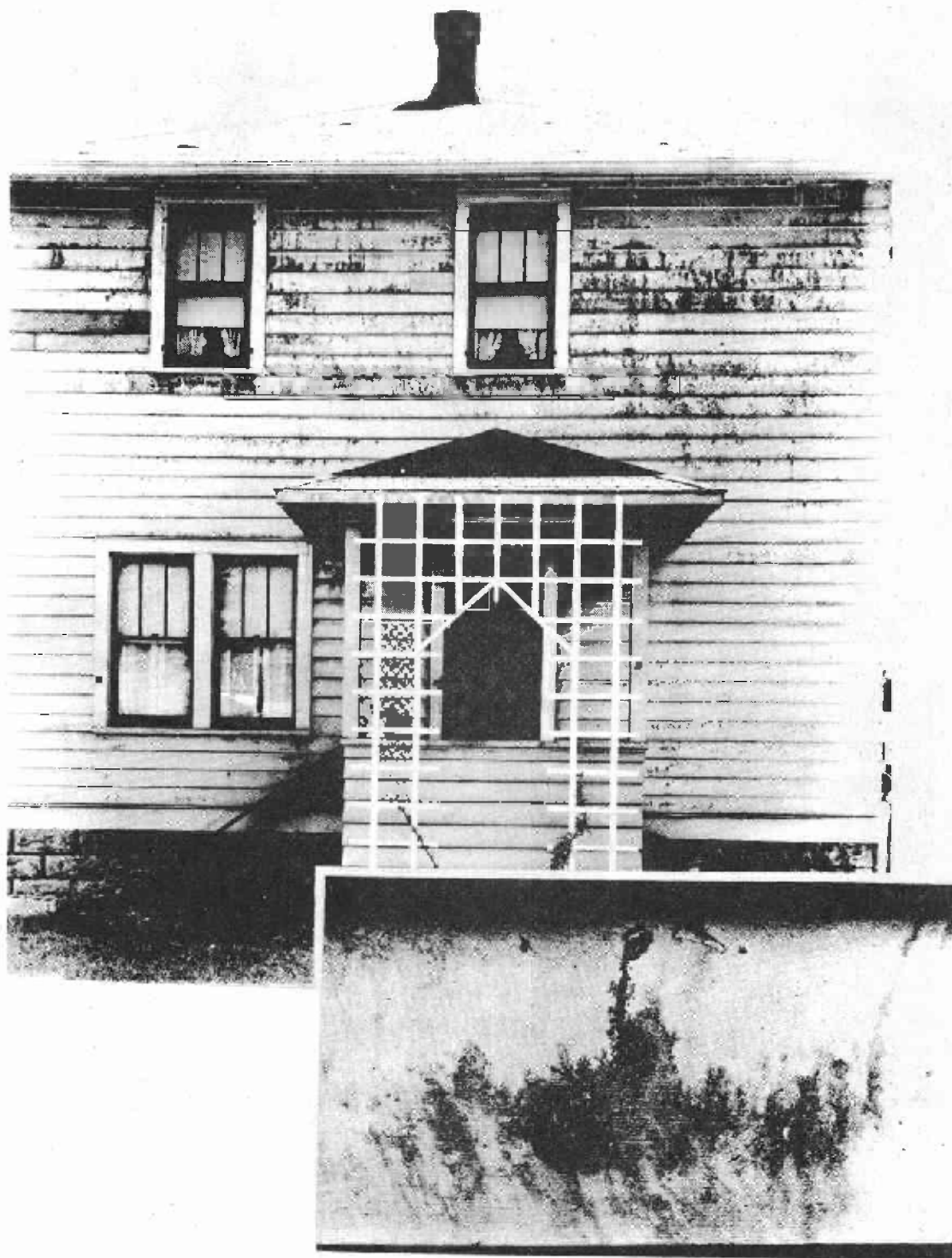
House No. 4.--The side walls of this house become wet every winter and by spring the boards of siding are thoroughly wet and scaling of paint results. The house was painted in March of one year, repainted in July the next year, and photographed the following year.

ZM 20299 F



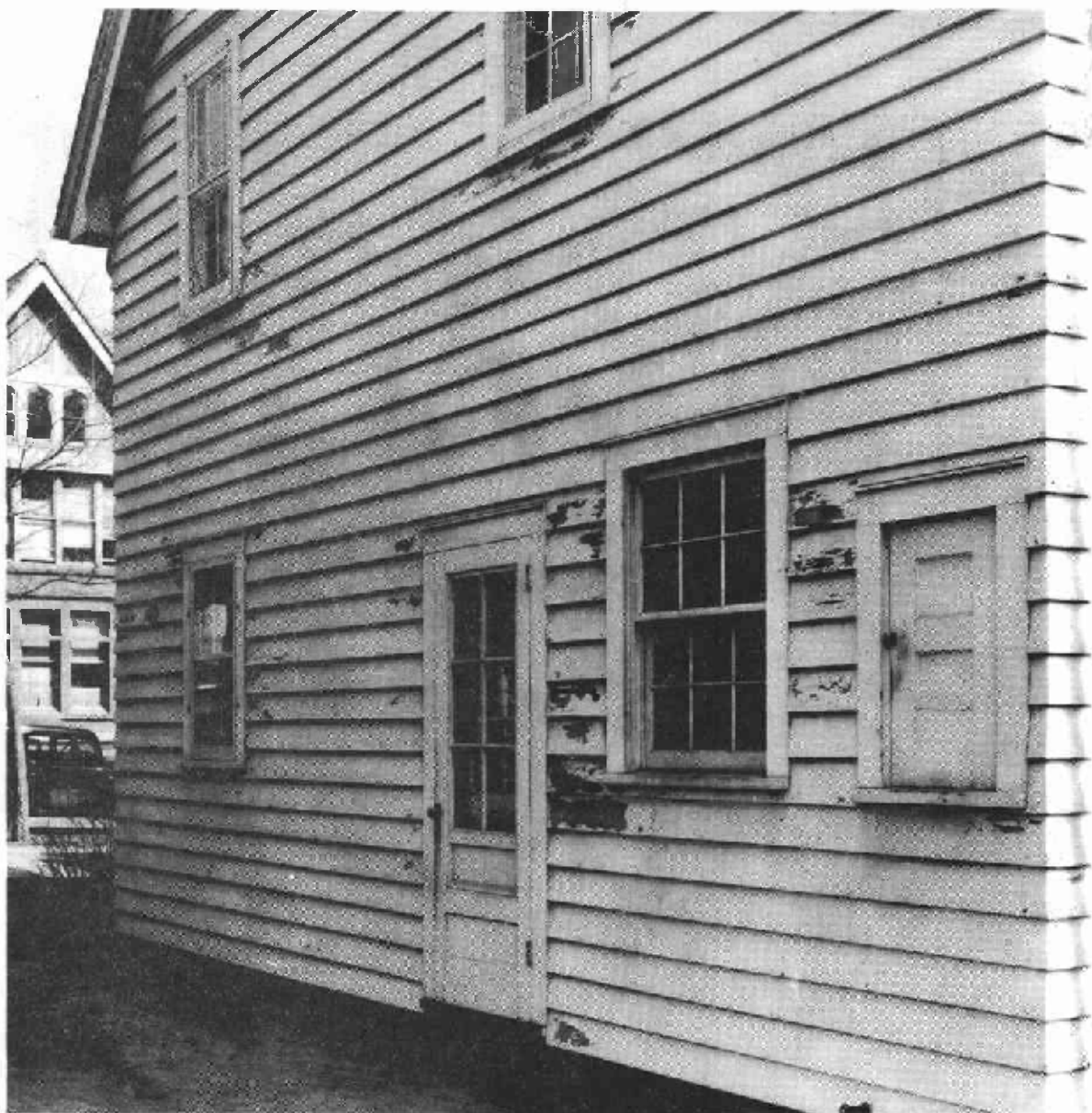
House No. 5.--The paint on all parts of the house was cracked as shown in the upper right-hand corner of the photograph. The boards shown contained 30 to 40 percent moisture when the photograph was taken.

ZM 25921 F



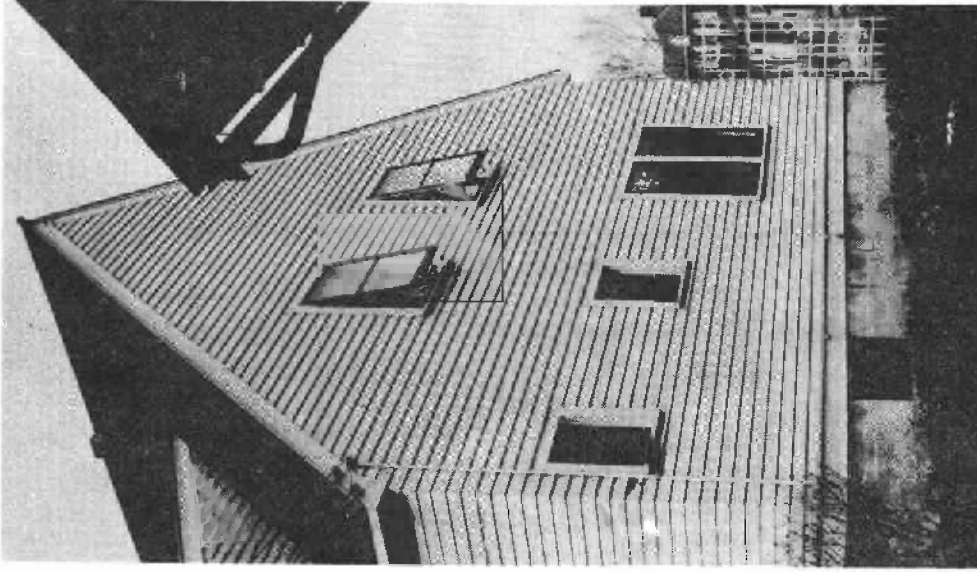
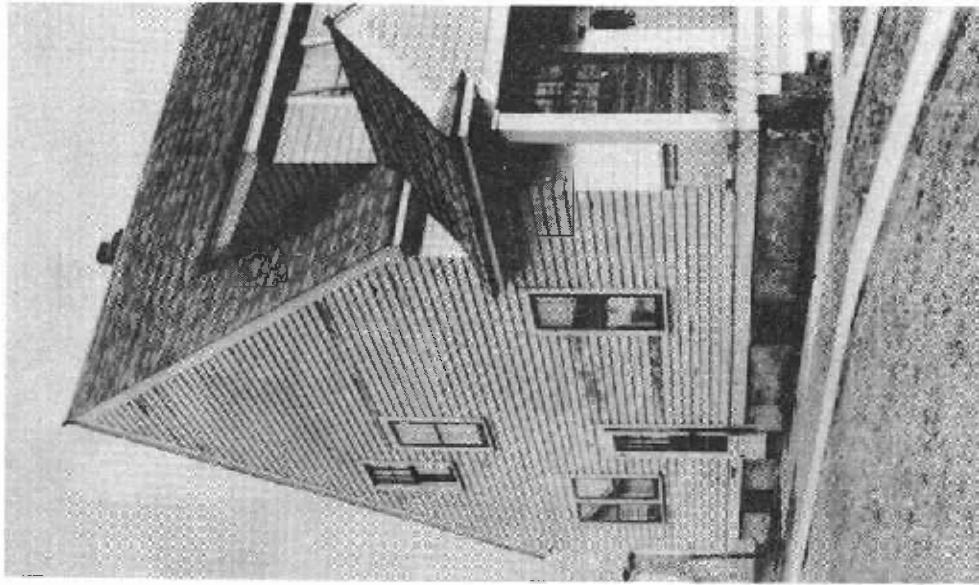
House No. 6.--Discoloration of white lead paint with water soluble substances in redwood siding caused by moisture in the side walls during the winter months.

ZM 26264F

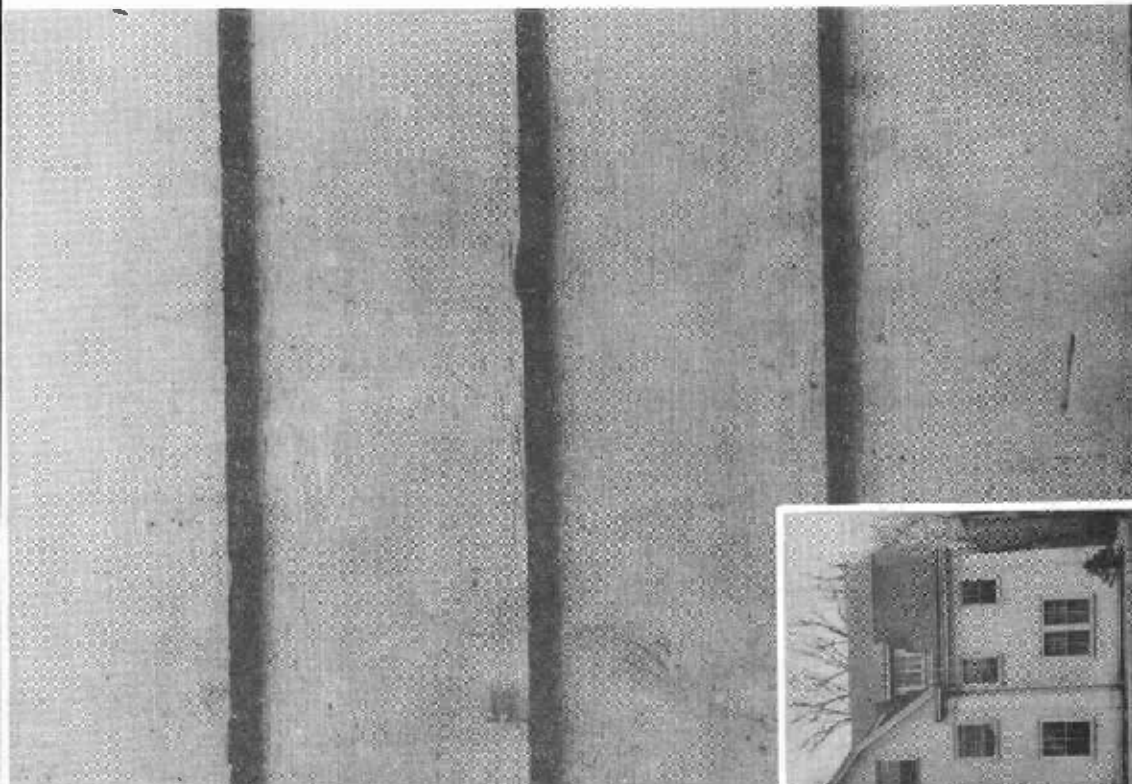
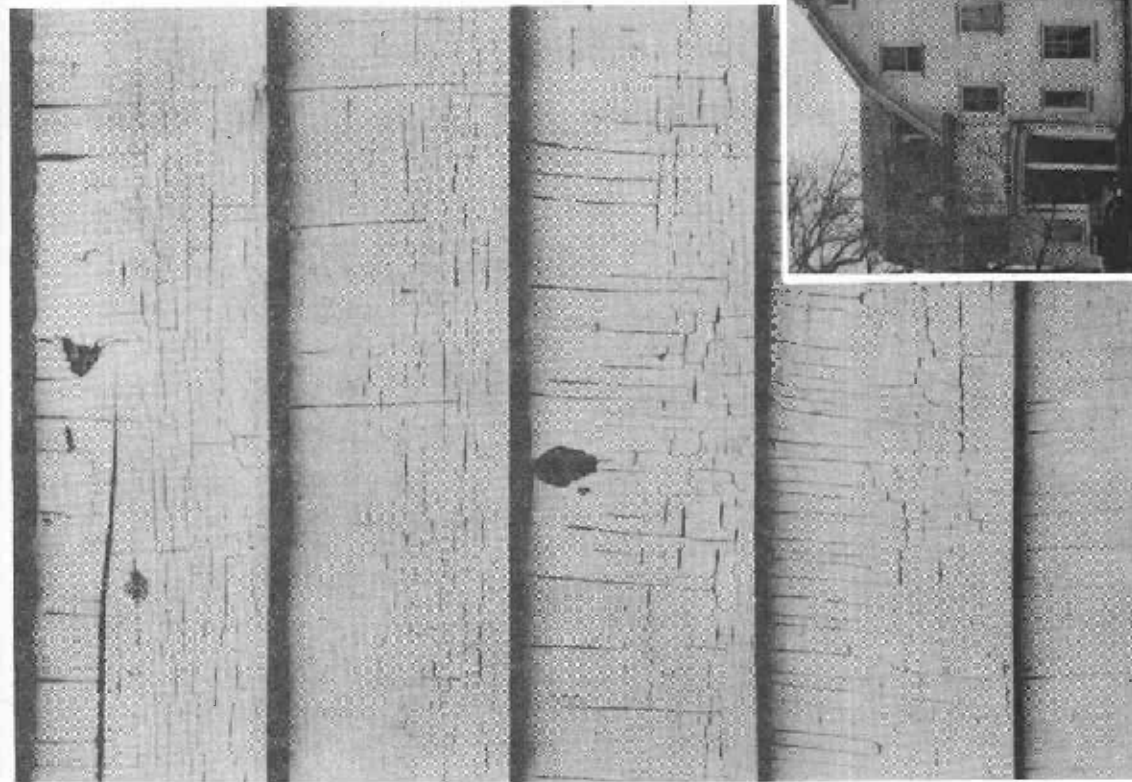


House No. 7.--In spite of the close resemblance to scaling caused by wet side walls moisture seems to play only a minor role, if any, in this paint failure. A coat of dark brown paint sandwiched between a preceding job of tinted white paint and a succeeding job of white paint made an incompatible coating. The white and brown paints are scaling from the tinted white paint.

ZM 25920 F



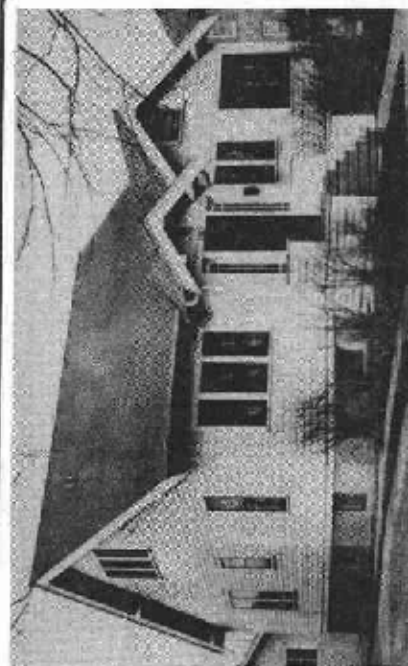
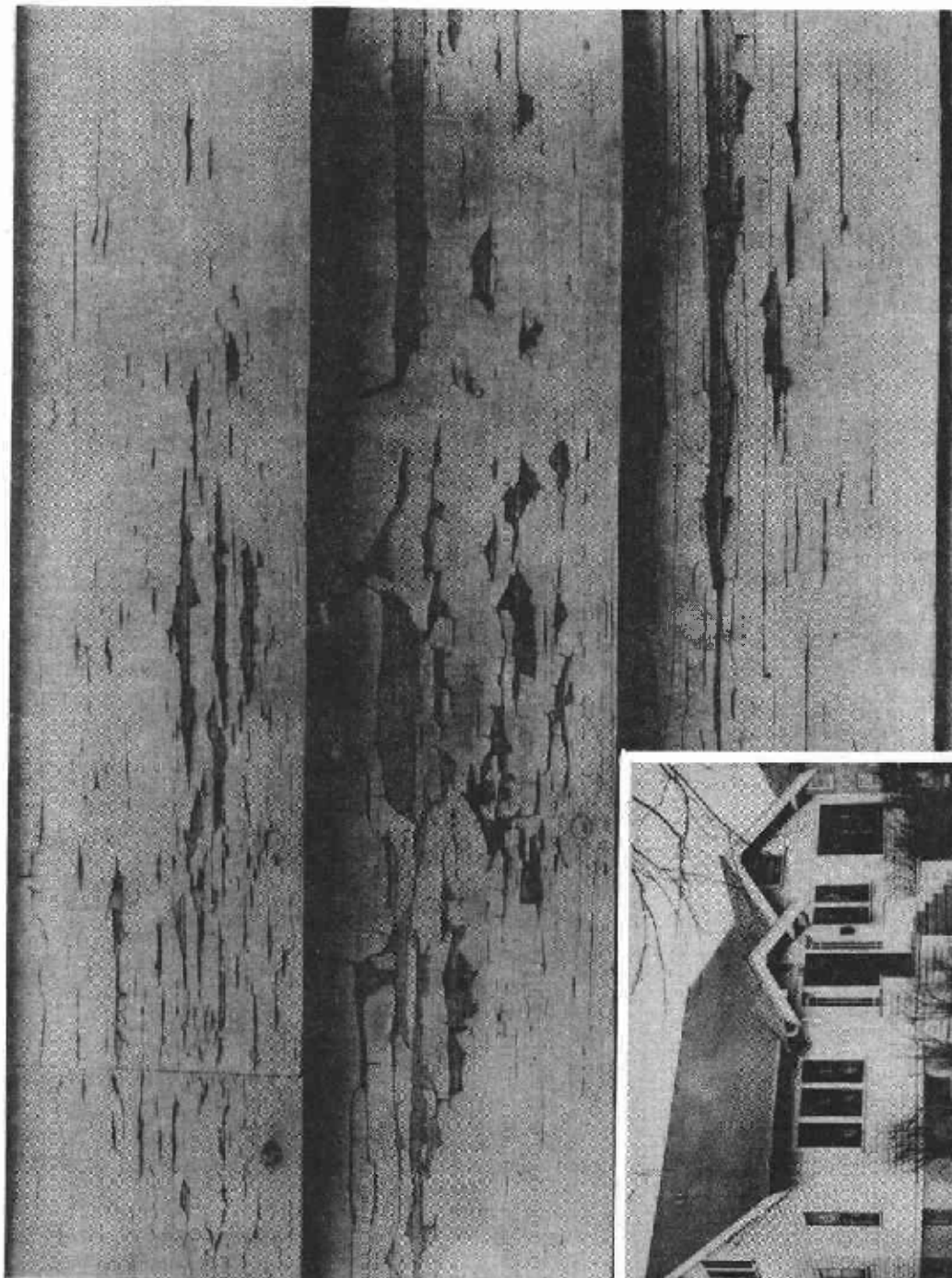
House No. 8.--Careful examination, including removal of boards of siding, shows that the side walls have always been dry. A quick drying type of paint was used over ordinary linseed oil paint on the north side (left), but the painter had so much trouble picking up laps that he added white lead paint to the quick drying paint for the other three sides. The south side (right) shows little scaling.



AN EXAMPLE OF INCOMPATIBLE PAINTS

On three sides of this house the paint has cracked and scaled badly as shown at the left. On the fourth side, which is more fully exposed to the weather than the others, the paint gives good service as shown at the right. On the bad sides the wood carries successive coatings of dark brown paint, deep yellow paint, dark gray paint, and at least three jobs of white paint. The good side was rebuilt after a fire some years ago and has only the last three jobs of white paint.

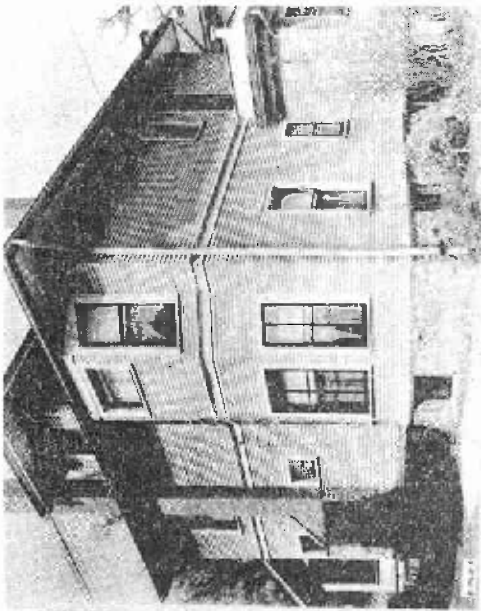
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INCOMPATIBILITY OF SOME WHITE PAINTS

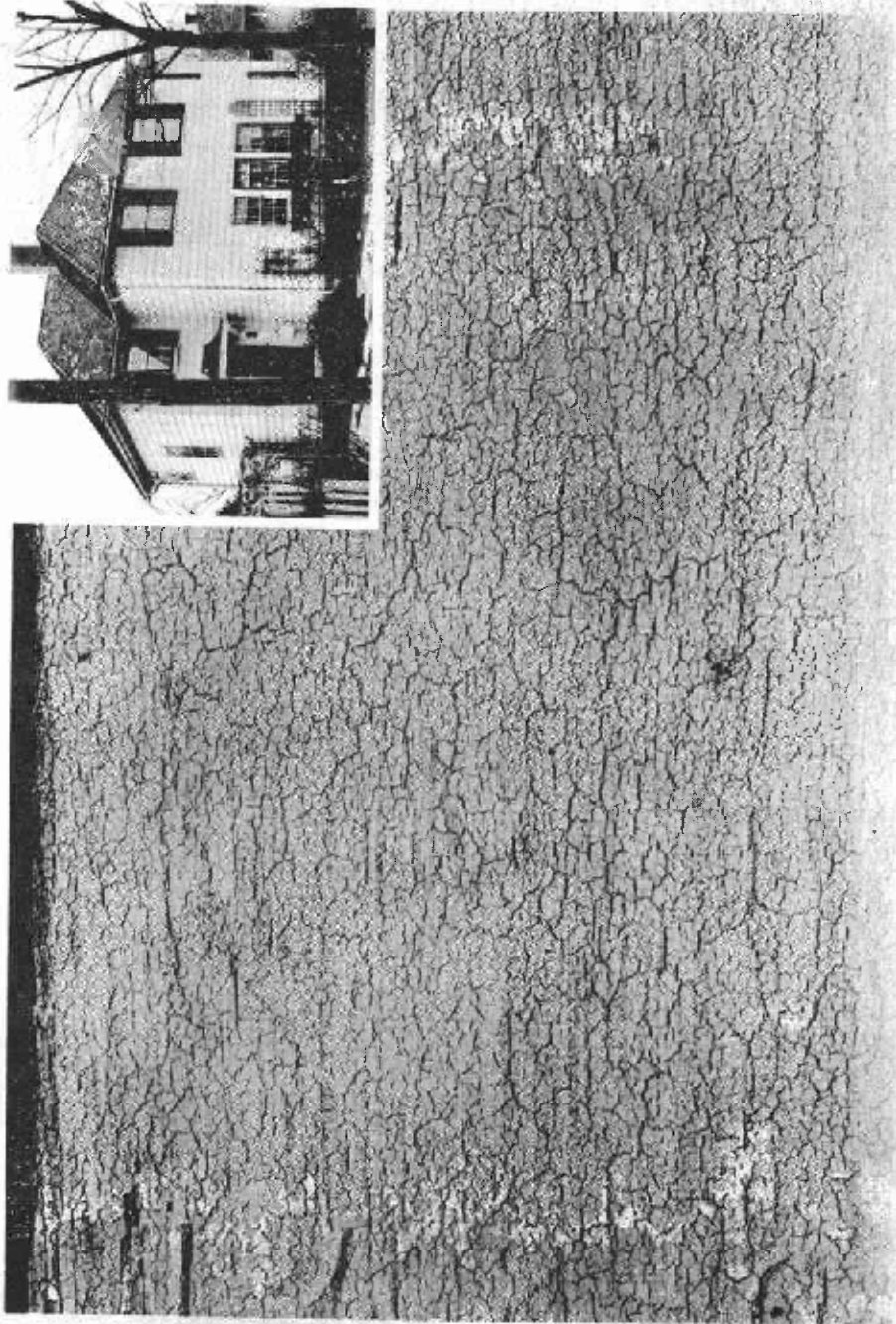
This house was originally painted with a lead and zinc paint and subsequently re-painted with a titanox, lead, and zinc type of paint. The last paint was a very good one, but it is falling in an unsatisfactory manner.

ZM26257



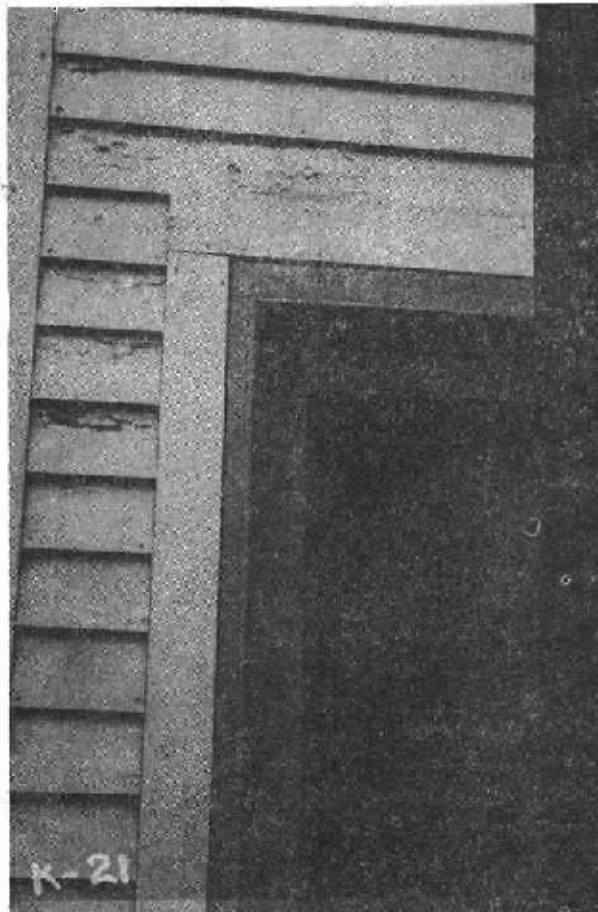
House No. 11.--A very typical form of failure of white paint applied over
paint of dark color.

ZM 26262 F



House No. 12.---Coarse alligatoring of pure white lead paint applied over old
paint of the lead and zinc type.

ZM 26263 F



A MOISTURE FAILURE AFTER CHANGING FROM A SOFT TO A HARD TYPE OF PAINT

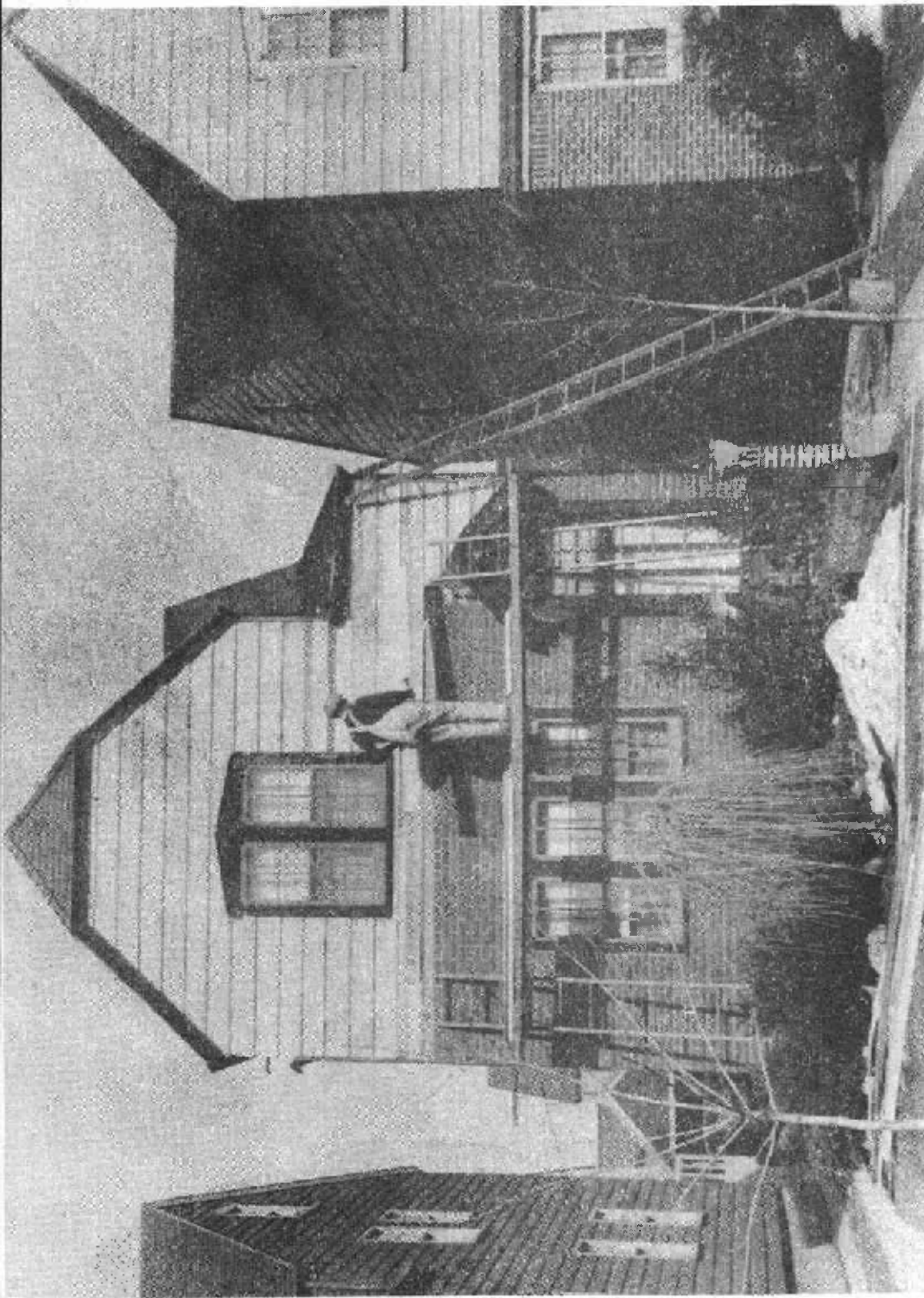
This house was built in 1931 and painted with pure white lead paint, which proved satisfactory to the owner. In 1934 it was repainted with a hard type of paint made with a quick-drying vehicle. The photographs were taken in June 1935. Besides the scaling paint shown typical moisture blisters were found and some of the boards of siding were wet.

ZM26592F



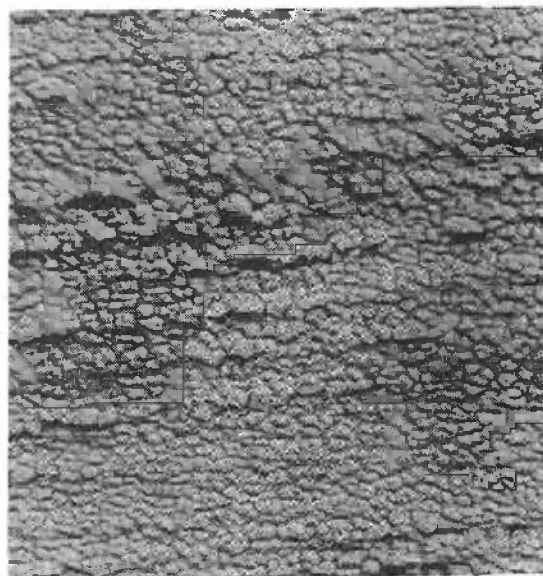
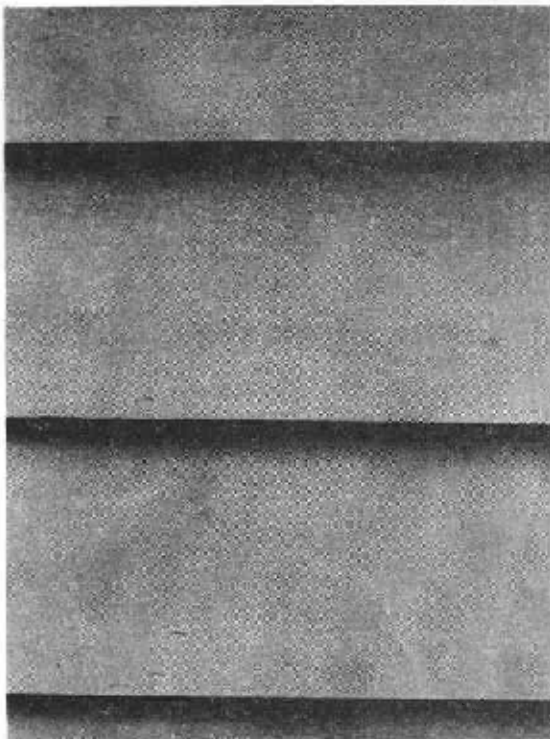
RESULT OF REPEATED NEGLECT OF PAINTS OF HARD TYPE

This building has been painted repeatedly with hard types of paint over a long period of years, but each time the owner waited until the old coating was disintegrating badly before putting on new paint. The surface can no longer be painted smoothly or durably unless the old coating is removed completely.

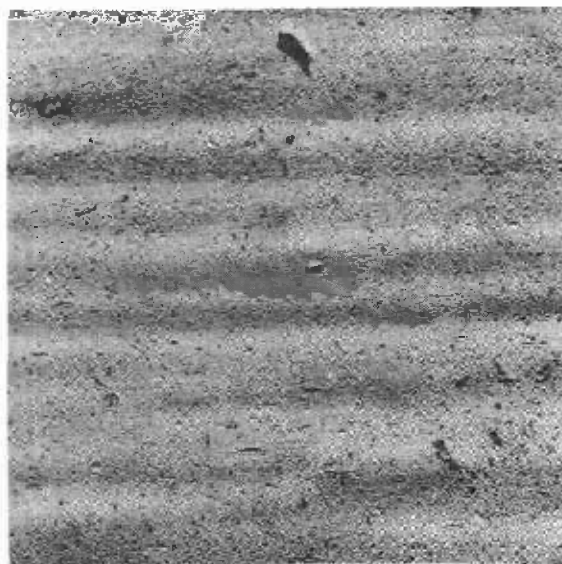
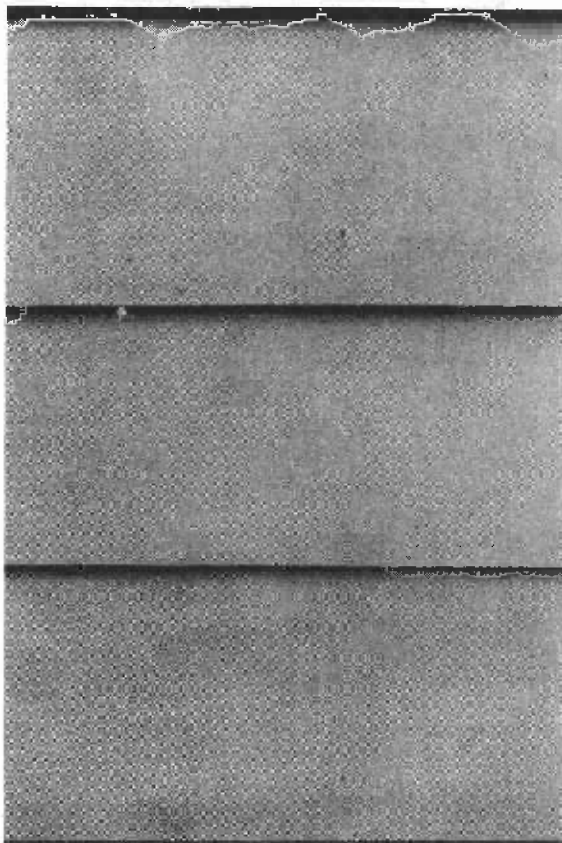


Paint troubles lead to loss of market for paint

This house is being covered with composition material imitating brick because several paint jobs on wood siding each failed within a year or two. The neighboring houses were likewise covered over with composition material or with stained shingles for the same reason.



A successful maintenance program in which paint of soft type is used with long intervals between paintings. This house, which is next door to the one shown in the previous illustration, was erected in 1923, repainted in 1931, and has not been painted subsequently. The photograph was taken in 1936.



A successful maintenance program based on applying one coat of paint of fairly hard type every four years. This house was erected in 1923, repainted in 1927, 1931, and 1935. The photographs were taken in 1935 just before the last repainting.