

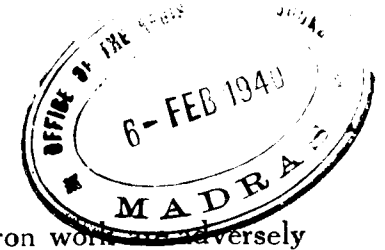
ECONOMICS OF SWADESHI

"I do not know much about tariff but I do know this much:—

"When we buy goods abroad we get the goods and the foreigners get the money; when we buy goods made at home we get both the goods and the money"

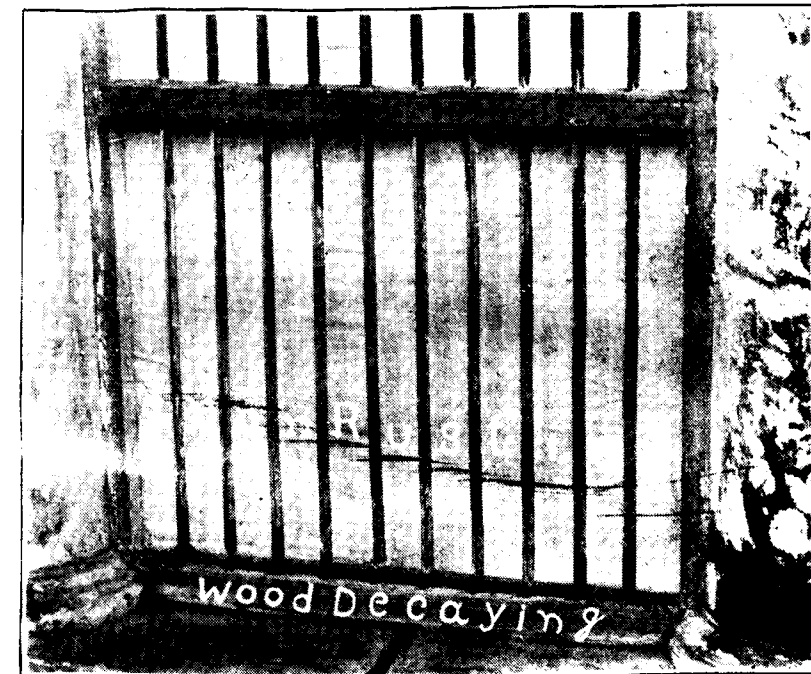
—Abraham Lincoln

OURSELVES



Structures Decay

It is common knowledge that wood work and iron work are adversely affected by weather. The rusting of iron and deterioration of wood are the visible signs of weathering.



Paint Protects

It is universally acknowledged that paint protects the understructure from destructive agents and prolongs its life. The cost of maintenance, by painting, of a structure, is found to be only a small fraction of the necessary expenditure to be incurred for renewing the unprotected structures at shorter intervals.

JANUARY, 1949

PAINT

When once it is recognised that paint is primarily a protecting material—its decorative possibilities being only secondary to protection—the use of a good paint—that really protects the understructure becomes imperative. A pie saved in the material cost by preferring a cheaper but less durable paint, may ultimately mean a tenfold loss in the quicker deterioration of the understructure.

Our Climatic Conditions

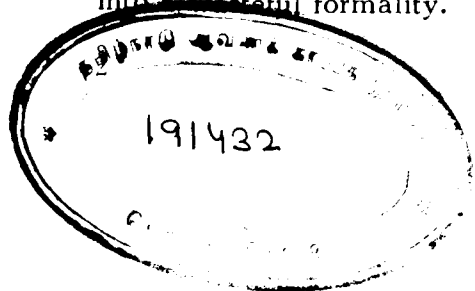
The climatic conditions of our country, particularly those of the coastal areas, are most trying for paint durability. The three major destructive factors—sunshine, humidity, and temperature are very high. Under the very severe climatic conditions as do prevail in some parts of our country, even modern synthetic coatings with the most suitable pigment composition are not able to satisfactorily withstand a couple of years' exposure.

Existing Methods

But the qualities of paints used and the working methods adopted for the majority of painting works in our country can hardly be relied upon to last and give adequate protection to the painted structures under the trying weathering conditions of our climate. An insight into the quality of popular bazaar brands, and the painting methods of the average house painter, in our country, makes one wonder whether the fundamental idea of protective painting is at all understood.

Consumer's Difficulty

Since painting is the last item in building expenditure, the average house owner with his unbudgetted expenditure will be very hard pressed for money when painting has to be done. He will therefore be in a mood to economise, and the temptation to go in for a cheaper grade will naturally be too strong for him to insist on proper quality in material and workmanship. In this way painting in our country is almost degenerating into a haphazard formalism.



Ignorance

Such light-hearted maintenance, by painting, of structures exposed to one of the most trying climates in the world is, to our mind, due to the ignorance of the paint consuming public about the painting methods to be adopted, and paint qualities to be used in our climate. The result is a great national waste which can easily be checked by educative propaganda.

Our Policy

We are not aware of any journal devoted to these aspects of paint and painting methods in our country. We therefore make bold to step into the field and strive our best to be of service to the painter and the paint consuming public.

Encouragement

In this connection we acknowledge with thanks contribution of Rs. 50/- from Messrs T. Namburumal Chetty & Sons, Engineers and contractors of Chetput, Madras, towards the Journal's fund. We welcome the spirit behind the contribution. With such willing co-operation of important firms and individuals in the line, our avowed object of educating the consumer and establishing a living contact between him and the producer can, we feel sure, be easily achieved.

THE PAINTER AND HIS WORK

The painter and his profession are not only ill developed but are also misunderstood in our country. Even among themselves, the sign writer and artist look down upon the professional house painter, as just a lay worker only knowing which end of the brush to hold and which end to paint with. A type of inferiority complex makes the average house-painter just a plodder in the age old routine, till better luck or more promising career comes his way. Even in the West where the painter's profession is more organised and developed, it cannot be said that the public have a high opinion of the painter and his job. In a popular article on the education of mentally defective children a French author has gone to the extent of recommending the house painter's job to the mentally deficient but unteachable class of children.

Who is a Painter ?

Though it must be admitted that the house painter's job is thankless, low paid, and uncertain, it is too much to maintain that it is for the feeble minded. There are already too many unskilled workmen of normal intelligence in the profession to entertain the mentally defectives also. On the other hand painting should be considered as a very involved art requiring great manipulative skill and understading. A really successful painter should be conversant with a variety of subjects from chemistry to geometry and psychology to economics. He should understand the fundamentals of paint formulation and should be able to successfully guess the reaction of paint to local climatic conditions. An ambitious painter should know the properties of different types of wood, metal, and plaster surfaces, and their reaction towards the coating materials. He must make due allowance for a variety of variable factors from shrinkages and expansions of painted surfaces, to humidity, temperature, and other corrosive factors. He should also bear in mind that the paint film required to last and protect surfaces widely differing in their nature and reactions when exposed to weathering conditions is hardly 1/30th inch thick.

THE PAINTER AND HIS WORK

Painter's Difficulties

Such considerations do not weigh with the property owner. He is interested in results and not in methods. In case of failures, for the moment, the qualities used and specifications insisted by the painter are not considered, and all attention is directed to pick up flaws in the finished work. Except in cases where the painting work is done under expert supervision, no regular study into the causes of painting defects is possible. The average painter with a hand to mouth living, meagre technical knowledge, and shaky self-confidence, is nonplussed and completely at sea to explain the causes and rectify the defects.

His duty and Limitations

Though it must be admitted that even the most carefully executed jobs are sometimes apt to fail for no apparent reason, the painter keen on keeping up his reputation cannot afford slipshod methods and select doubtful qualities. No amount of care is too much for his work. He should understand that in very many cases the painter is more likely to be at fault than his paint. The quality paint of any reputable factory, is not a haphazard mix of pigments, drying oils, and thinners. It is a scientifically compounded product manufactured from carefully selected raw materials to conform to definite specifications. The painter on the otherhand has to deal with a variety of variable factors, not all of which are within his control. Any unforeseen change may upset his whole procedure.

Therefore the Painter should not only be very careful in the execution of work but should also keep under observation the works done by him from time to time. He should systematically note the effects of weathering and local factors on his materials and methods, and go into the causes of premature failures. When confronted with extraordinary cases he should put before the paint manufacturer all necessary details of methods adopted with the type of failure evident and seek his advice. The painter or the painting contractor is often in a very unenviable position with regard to many of his works. Very often, he is obliged to execute jobs at

rates which will not allow proper material selection and surface treatment. In such cases the painter has to choose between the rejection of jobs at unworkable rates, and the lowering of quality to suit the rate. Very few in the profession are in a position to do the former and the latter course is to the detriment of the profession.

Paint Selection

In the matter of paint selection for the work on hand there are two different problems to be faced :—

(i) the suitability of the material for the work on hand, and (ii) the compatability of the newly selected paint with the older type previously on the structure. In the matter of paint selection due allowance should be made to the conditions under which it has to stand. There is no universal paint to withstand all climatic conditions. The paint manufacturer is quite alive to the fact and makes a variety of paints to withstand various conditions. A priming paint is formulated to give a different service from that of a finishing paint and one cannot therefore be substituted for the other. If this selection of a suitable paint for the work on hand is to be done by one with no grounding in paint technology, from an endless variety of range offered the position is hopeless. Regarding the question of compatability of two types of paints the average Indian painter need not bother himself very much. Generally speaking by the time the property owner decides on repainting, not only is the old paint completely washed off and gone, exposing the wood work and metal work bare, but the structures also are half way deteriorating. As such the problem presented in repainting is the more laborious task of cleaning the weathered wood and rusted iron and getting a durable and presentable finish on a hopeless surface.

The Market and the consumer

The specifications of the Indian stores department have tried to specify some classes of paints. These specifications, being mainly dependent on analytical data and empirical constants have their limitations. In the bazaar, paints and varnishes prepared to standard depart-

mental specifications are not generally offered for sale. The paint consuming public have practically no idea of these specifications and generally rely on an equally ignorant paint merchant and painter to their great disadvantage. Even an elementary test will prove that the "superior white stiff paint" generally accepted as white lead paint is a highly reduced paste in oil of a lead-free white pigment called lithopone. The low priced varnishes sold as "Superior pale copal varnish" are mostly solutions of lime hardened rosin in turpentine and occasionally even in kerosine oil. The ignorance of the paint consuming public in accepting such spurious materials for the genuine varieties is shockingly true.

Specifications and Schedules

Even in the more systematised departments supposed to be under expert supervision woeful ignorance about paint and painting technique is evident. The spirit of specifications is sometimes sacrificed in the anxiety to act up to its letter. The prevailing tender system has fostered unhealthy competition and became in practice, a preference of lower quotations to quality work. The rates quoted in tenders put in for the execution of an estimated work are supposed to be lower than the estimate rates. A close examination of the painting expenditure provided in provisional estimates, in relation to the severity of weathering conditions under which the paints are expected to protect the painted structures, will reveal their absurdity.

The Typical Painter

Painting being the final item of expenditure in building construction and repairs, the painter is not unoften expected to rectify or at least hide the defects of his predecessors on the job. The property owner is practically at the end of his resources when the painting has to be done, and tries to somehow manage matters to have the satisfaction of just completing the work. He expects best work at least cost. In ninety-nine

cases out of hundred the painter is confronted with a bad paymaster in a hard task-master. Thus the definition of a painter, given in "The Decorator" when modified as: "one who competes for the responsibility of applying materials the constituents of which he knows little, to surfaces of which he knows even less, under conditions highly problematical, in a limit of time usually inadequate, at rates hopelessly unworkable" appropriately depicts the Indian painter of the present day.

ECONOMICS OF PAINT SELECTION

Leaving out for the present, the preparation of surfaces, and painting technique, including decorative layout and colour harmony, the first important problem that confronts a conscientious painter called in to paint or repaint a structure is the selection of a suitable paint for the purpose. He should see that the cost of finished work should be consistent with adequate protection and necessary decoration.

What to select?

When selecting a paint for the work on hand, not only its visual colour but also, its finish, durability and covering capacity etc., should be carefully considered. In paints and varnishes there are a number of shades, brands, and qualities ranging from the highest to the lowest. In some cases misleading names are given to the products. A "superior white paint stiff" may be neither superior nor white, while "a superior pale copal varnish" may be an ordinary rosin varnish without even a trace of gum copal in it. The names "Red Oxide," "Chocolate" "Green" etc. are simply the names of the particular shades of the paint and do not tell anything about their quality. A green paint may cost from two annas to two rupees a pound. The price determining factor is quality and not the shade. For all practical purposes a good paint should be easy flowing, cover more area per pound, give a pleasing

finish, and afford adequate protection to the painted structure for a reasonable length of time. The paint film on exposure should weather uniformly giving a surface which requires minimum cleaning to prepare it for repainting.

Covering Capacity

The cost of painting any given area depends on:— (1) Cost of paint. (2) Cost of application. Any calculation of the cost of paint material should be based on a knowledge of the covering capacities of the paints to be used. A comparatively cheap paint with lesser covering capacity may cost more than a costlier paint with a higher covering capacity. A paint, 3 lbs. of which are required to cover 100 sq. ft. for one coat work, though costing only as. 6 per lb., will be costlier than a paint of which only 2 lbs. are required for single coat work on 100 sq. ft. though costing as. 8 per lb.

When considering the implications of covering capacities, it will not be out of place to discuss the bearing of paint composition on its covering capacity, durability etc.

What is Paint?

Ready mixed paints based on oil and oil-varnish media consist of finely divided solids, called pigments, well suspended in a liquid, called medium. The pigments give colour and opacity to paints, while the medium gives finish, and makes the paint film adhere to the painted surface. When applied in thin films the medium in paint gradually sets to a solid mass, and acts as a cementing material for holding together the pigment particles as a continuous film. Since, generally speaking, the pigment will not be able to adhere to a surface and protect it without the help of the medium, the quality and proportion of the medium may be said to influence the paint quality to a great extent.

Why Paints are Heavy?

The medium in ordinary paints is linseed oil, raw or boiled, with a proportion of turpentine in ready-mixed paints. In good quality paints

however it is mainly a judicious blend of heat-treated drying oils, gums etc. with proportions of turpentine. (The small percentage of driers though very greatly influencing the paint quality are omitted in this discussion.) Therefore the specific gravity of any type of paint medium is only about 0.9. The specific gravity of pigments on the other hand is rarely below 2.5 except in the case of some carbon blacks. Thus while a cubic foot of medium weighs only about 57 lbs. a cubic foot of pigment weighs rarely below 170 lbs. i.e. thrice as much. Therefore the more the pigment proportion in a paint the heavier it will be bulk for bulk. To get a paint film of average thickness over a given area more of the heavier paint is naturally required. Therefore, the heavier the paint, the lesser the area it covers weight for weight. The general practice of supplying enamels and superior quality paints by measure instead of by weight can easily be understood if we bear in mind that the percentage of medium in them is very much higher than that of the pigment. Since the medium is much lighter than pigment its predominance in paints will make them lighter bulk for bulk.

Medium & Pigment

The medium is the binder for the pigment particles and paints crack or chalk when the medium loses its toughness and binding power. Since in most of the high class finishing paints formulated to give gloss and outstanding durability there is a predominance of medium over pigment, they lack good hiding power. In the preparation of highclass paint-media polymerised drying oils as linseed stand oil and resins are used. Due to the relatively high viscosity of such media they cannot take in a high percentage of pigment and still give paints which are easily brushable under ordinary conditions. If on the other hand too little pigment is used the paint films will have poor hiding power. By using genuine colouring pigments with greater obliterating power and depth of tone, the necessary obliterating power in the paint films can be had with a minimum of solid content. The genuine colouring pigments, polymerised oils, and high class varnishes, used in the formulation of quality paints are naturally costly, and paints formulated with them cannot be said to be cheap weight for weight, in spite of their excellent qualities.

Cheap Paints

In the majority of cases where the manufacture of paint is understood as the marketing of a cheaper substitute to an existing quality, price considerations rule supreme. The most helpful material for a paint manufacturer bent on cheapening his paints is barytes. This is chemically barium sulphate. It occurs in plenty in the Ceded Districts of the Madras Presidency, and to some extent in Rajaputana. In powdered form fit for use in paints, it costs about $\frac{1}{2}$ anna a pound. This barytes is known as an extender in paint language. Extenders have no individual colour when ground in oil. Therefore all colouring pigments can be blended with large amounts of extender without greatly altering their visible colour in oil. The cheap dry colours we get in the market, contain large amounts of extenders and very little amounts of colour giving pigments well ground and intimately mixed. To brighten up dull colours resulting from this undue dilution of colouring pigments a small amount of mineral oil is added during grinding. That is why the cheaper grades of dry colours smell of mineral oil.

When paints are formulated with price considerations these highly reduced powders are used as pigments. Since such powders consist mostly of extenders which have no colour or opacity in oil, the paints made with them lack hiding power unless applied in very thick films. To ensure such thick films in painting, every endeavour is made to incorporate more pigment and less medium in the paint. The media used are ordinary linseed oils of low viscosity and high wetting power while the pigments and extenders of low oil absorption are preferred. Thus easy brushability is obtained with a minimum of medium. The result is a thick paint which looks cheap weight for weight though actually dear when covering capacities are considered.

That is not all. Since the actual colouring ingredient in the cheapened paints is very little, as soon as the strength of the medium lessens, the extender's white colour manifests itself and colours become dull and faded in a short time. As a matter of fact the oft-complained fading of

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greens and bright reds on outside exposed portions, in a surprisingly short time is due to this undue dilution of the colouring substance to produce a cheap paint.

Some Exceptions

From what has been said above, it should not be inferred however, that all heavy paints are inferior and light paints are good. Red lead and white lead are perhaps the heaviest pigments used in paints. They have relatively low oil absorption and poor spreading capacity. But paints based on red lead for iron work, and white lead for wood work, have an unassailable position in paint world. No doubt the arrival of some white pigments as zinc oxide, Lithopone, Titanium dioxide, etc. has to some extent affected the position of white lead; but red lead for iron work is without a rival. Again straight bituminous solutions hardly weigh 9 lbs. per gallon and yet are found to crack and deteriorate very quickly when exposed to the bright sunshine of our country.

Some Conclusions

What is intended in the above discussion is to bring home to the reader the following facts:—

1. Qualities selected, because they are cheap, contain in the majority of cases cheapening materials which adversely effect paint quality.
2. Since paints intended to give reliable service are formulated with genuine pigments and superior media, their costs weight for weight may appear high, but they are cheaper in the long run.
3. In the matter of paint selection quality should not be sacrificed to price considerations.

Painting Cost

Having understood the bearing of paint composition on its durability, covering capacity etc. the painter should turn to the matter of painting costs in any job to be undertaken and should consider its bearing on paint selection. Painting costs may be grouped under three heads.

(1) Brushes, scaffolding, supervision and other sundries. (2) Cleaning and preparation of surfaces for painting. (3) Actual labour for painting incurred. Generally speaking scaffolding, supervision, sundries and brushes are nearly the same for all types of paints though it must be admitted that (a) brushes wear out much quicker with reduced quality cheap paints containing large amounts of extenders (b) the supervision has to be much closer and consequently costlier to get a uniform and satisfactory coating with heavy paints of poor hiding power.

Surface Preparations

But the cost of cleaning a surface and preparing it for repainting depends to a large extent on the surface presented by the previous paint on weathering. If the old paint were to crack and blister, its complete removal will be necessary before repainting could be taken up; otherwise a very uneven surface, bad in appearance and worse in durability will result. Paint removal means extra labour-expense. If the old paint presents on weathering a slightly chalked surface free from cracks and blisters, simple sand-paperying will be all that is necessary to prepare the surface for repainting. Preparing a surface for repainting by simple sand-paperying costs only about As. 4 - for 100 sq. ft. while paint removal costs more than Rs. 1-8-0 for 100 sq. ft. A good paint on weathering should not crack, blister, or peel off and lose hold on the understructure. It should in addition provide a good key (hold) for the succeeding paint coats. When paint films are exposed to weathering conditions, and the medium loses original strength, outside stresses will cause great strain on the weathered film. The film has to fail one way or the other ultimately, and the most desirable failure is by chalking free from blisters and cracks. Therefore a painter who is alive to the fact that painting is a recurring expenditure and a number of repaintings may have to be done by him on a structure at intervals, will not risk the use of a paint which presents a cracked and blistered surface on weathering, simply because its colour is a bit more showey and its price per pound is cheaper. Any initial saving will be more than offset by the extra cleaning labour required to prepare the weathered surface for repainting. Again a few repaintings with a heavy paint giving thick films will make the resulting

paint coating too thick to necessitate its complete removal at very short intervals. With lighter paints giving thinner films however, many more repaintings could be done by the time the paint coating will be thick enough to necessitate its removal before repainting. But it is not unusual however to find customers ignorantly insisting that paint films should be thick and not thin. As a matter of fact the majority of paint consuming public in our country are so accustomed to the use of highly reduced paints, only thick films of which can give necessary hiding power, that many have begun to believe that only thick paint films protect. Nothing can be farther from the truth. Protective value of a paint film does not lie in its thickness. It lies in its ability to shield the under structure from destructive agents. A copper sheet however thick is not equal to a thin asbestos sheet, for heat insulation.

In calculating painting labour and its bearing on paint selection, due allowance should be given to the fact that a painter takes pleasure in working with an easy brushable, free flowing paint which works smoothly under his brush without undue pulling. Consequently the painter covers more area in a given time with a smooth working paint. On the otherhand a painter made to work with a heavy working paint, which pulls and fouls his brush, gets easily tired and vexed. He may not be able to cover even 2/3 the area he could cover with an easy flowing paint. If the painter is paid Re. 1/- per day and can cover 300 sq. ft. with an easy flowing paint the cost of painting labour is Rs. 0-5-4 per 100 sq. ft. With heavy brushing paint he may hardly cover 200 sq. ft. and it means painting labour is Rs. 0-8-0 per 100 sq. ft. per coat.

Paint Durability

The bearing of paint durability on paint selection is another important point. It has been stated above that generally the cost of painting is equal to the cost of paint material. Thus in any finished work worth Rs. 100/- the paint cost will be Rs. 50/-. The painting cost of Rs. 50/- will be nearly the same for all qualities of paint while the cost of paint may be less or more according to the quality selected. Suppose by using a 1st quality paint the paint cost is increased from Rs. 50/- to Rs. 70/- and

by using a cheaper grade paint the cost is reduced from Rs. 50/- to Rs. 30/- and that while the 1st quality paint lasts for two years, the cheaper grade lasts only 1 year. Then the repainting should be done every year with the cheap grade paint while, when 1st quality paints are used, repainting is necessary only every third year. The cost of finished work with 1st quality paints in the above example will be Rs. 120/- (Paint Rs. 70/- and labour Rs. 50/-) and with cheap grade only Rs. 80/- (Paint Rs. 30/- and labour Rs. 50/-). At first sight it looks as though there is a saving of Rs. 40/- by using the second quality on the work. But during a maintenance period of two years, painting should be done twice with the inferior grade while none is necessary with 1st quality material. Therefore the maintenance by painting for two years, costs only Rs. 120/- with 1st. quality while it costs Rs. 160/- with second quality paints (2 X Rs. 80/-), which means an actual saving of Rs. 40/- in the painting item by using the 1st quality paint. Thus *the use of a good durable paint at even more than double the cost of an inferior paint will really be cheaper in the long run.*

Paint suitability and Compatability

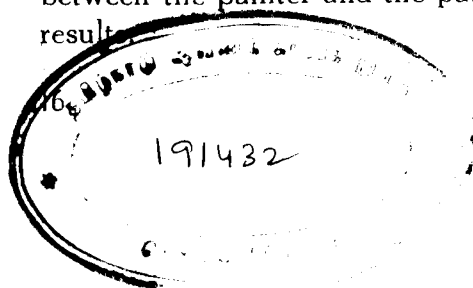
Such are the considerations which should influence the Paint Selection in general. There are, however, other questions such as, the suitability of a paint type for a definite work on hand, and the compatability of two or more types of paints. These are very complex problems which cannot be adequately discussed in this article. To guess the suitability of a paint for the job on hand, the painter should not only have a good working knowledge of the climatic conditions of the locality, but also an intimate knowlege of paint composition and its bearing on paint durability under the circumstances. The painter should get into touch with the paint manufacturer, furnish him with full particulars of the existing conditions and painting methods proposed to be adopted, and follow his advice.

To be sure of the compatability of two types of paints is also no easy matter. The varied number of paint durability tests conducted at various testing stations and paint manufactories are more concerned with paint suitability than paint compatability. It is very rare that we find a manu-

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facturer trying exposure reactions of his paint over a paint of another manufacturer. The usual practice in the conduction of exposure tests by any manufacturer is to give his own priming, knotting, under-coating and finishing on the test plate to be exposed. Therefore in the present state of our knowledge no definite conclusions can be possible on the subject. Broadly speaking there are two types of paints--the hard drying and the soft drying; of the two white pigments, white lead, and white zinc it is known that white lead gives soft elastic films while white zinc gives hard brittle films. In such a case, naturally, a finishing paint based on one white is not compatible with another paint based on the other. Repainting with a soft drying paint over an aged hard drying finishing may peel off due to inadequate penetration and lack of proper key or adhesion of the super-imposed film. On the other hand the repainting with a hard drying finish over a soft drying one will lead to premature cracking. An analogous type of incompatibility is met with by painters using superior qualities over inferior previous coats. Very often the inside doors and windows of houses are varnished with a pseudo copal varnish which is actually a solution of common rosin, cooked with a little slaked lime, in turpentine or white spirit. These rosin varnishes, unlike genuine copal varnishes and drying oils, do not dry by oxidation and polymerisation. They dry by the simple evaporation of the turpentine content in the varnish. The dried film in these cases redissolves and softens in the thinners used in paints. Therefore when good quality enamel type paints are painted over such varnish or varnish paint films, the rosin in the bottom coat resoftens. The film remains tacky for a very long time even though the newly put on paint is a quick drying type. The finishing coat dries hard while the under coat is still fluid or plastic and due to the absence of a firm base for the hard drying top coat the newly put on paint though very elastic and durable will crack and fail. In such cases the best method is to remove the old paint before repainting. The paint manufacturer with an intimate knowledge of the composition of his paints, their uses and limitations, will be of great service to the paint man in selecting a suitable paint for his work. A close co-operation between the painter and the paint manufacturer is essential for satisfactory results.

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