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*Annual Report, Report of AGM
Joint Programmes 1981-82
enclosed to UK and
Irish Section members*

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OCCA Bulletin

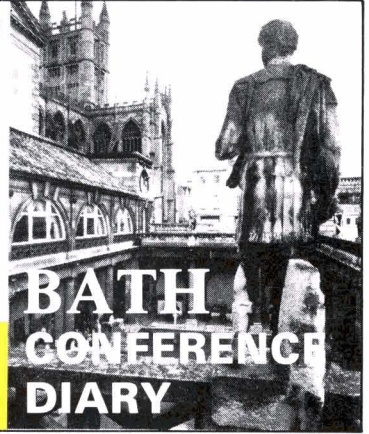
containing news of forthcoming
Section and Branch activities.
This Bulletin will be included each
month to UK and Irish
Section members

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OCCA GOLF TOURNAMENT

9 September 1981, Stockport

See OCCA Bulletin & Joint Programmes for further
details



JOURNAL* OF THE
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OLOUR
CHEMISTS'
ASSOCIATION**

**OCCA-34
Exhibition**

*see page 326, for further details fill in and return
form on outside back cover*

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pH shift in acidic lithographic fountain solutions – the influence of drier type

L. Campey

Coatings for galvanised steel in industrial building

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Maleopimaric acid from gum rosin of *Pinus roxburghii*

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IMPORTANT CORRECTION TO PAGE 327 The figures given for products manufactured by visitors to OCCA-33 should read:

	Percentage
Paints	21.98
Coverings and Coatings	5.14
Resins	6.79
Pigments and Dyes	8.76
Dispersants and Solvents	1.46
Inks and Graphic materials	8.19
Plastics	1.33
General chemicals	9.84
Other	25.65
Cards not completed	10.86

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Journal of the Oil and Colour Chemists' Association

Vol. 64 No. 8 August 1981



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pH shift in acidic lithographic fountain solutions – the influence of drier type

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Summary

The phenomenon of pH shift in acidic lithographic fountain solutions is investigated from the point of view of drier selection for the lithographic inks to be used.

Driers were found to be a contributing cause of pH shift. The degree of change seems to be independent of the drier metal but dependent on the anion used.

Keywords

Types and classes of coatings and allied products

lithographic ink

Raw materials for coatings

driers

drier

Processes and methods primarily associated with manufacturing or synthesis

pH control

Le déplacement du pH en mouillages acides. L'influence du type de siccatif

Résumé

Le phénomène du déplacement de pH en mouillages acides a été étudié au point de vue de la sélection du siccatif pour les encres lithographiques destinées à être utilisées en présence de ces mouillages.

On a trouvé que les siccatifs ne constituent qu'un des facteurs qui provoquent un déplacement du pH. Il paraît que le taux de déplacement dépend de l'anion et ne pas de l'ion métallique du siccatif que l'on utilise.

Der Einfluss des Sikkativtypes auf der in Sauerwischwasser vorkommende pH-Wertverschiebung

Zusammenfassung

Das pH-Wertverschiebungsphänomen in Sauerwischwasser wird vom Standpunkt des Sikkativauswahl hinsichtlich der Lithographie-Druckfarbe, die mit diesem Wischwasser benutzt werden wird.

Es wurde gefunden dass Sikkative nur einer der pH-Wertverschiebungsfaktoren bilden. Es scheint dass die Verschiebungsstufe von dem Anion und nicht von dem Metallion des angewandeten Sikkativs abhängt.

Introduction

It is known that acidic lithographic fountain solutions tend to shift towards neutral after relatively short press running times. Unless corrected, this shift can result in loss of print definition, scumming and other problems associated with the loss of ability of the fountain solution to keep the non-printing surfaces of the lithographic plate clean.

The ink industry has been aware that different inks have differing effects on fountain solutions but the mechanism was not fully understood. The work reported in this paper is the result of a co-operative effort between Nuodex Canada Ltd and Inmont Canada Ltd. It results from observations by Inmont Canada Ltd that the removal of

driers from an ink led to a reduction in pH shift in fountain solutions of 1-2 units.

Procedures

The basic purpose of this work was to measure quantitatively, the direct effect of driers on fountain solutions. The test method used was developed by Inmont Canada Ltd for testing pH shift caused by inks. The method is as follows:

1. Switch on the pH meter. Allow it to warm up for at least 5 minutes (some models need longer warming up time). Standardise the pH meter with pH 4 and pH7 buffer solutions.

2. Prepare a fountain solution by mixing Rosos 726AV with water at approximately 2 ounces to 1 gallon to give a pH reading of 4.2-4.6. Note that the pH shift test becomes meaningless if fountain solution is above or below the specified pH range.

3. Using an ink pipette (Inmont brass volumeter), measure 24 notches (4.8 ml) of ink and transfer into a 150 ml mortar.

4. Measure 10 ml of the standard fountain solution and pour it into the ink.

5. Mull vigorously by hand with a pestle for 5 minutes.

6. Pour the solution from a graduated cylinder into a small plastic cup (15-30 ml) then determine pH, this is a pH reading after exposure to ink. The difference in pH readings of the solution before and after mulling with ink is the pH shift.

7. The pH shift should be less than 1.0 (i.e. if the fountain solution by itself reads 4.2, the solution after mixing with ink should read no higher than 5.1).

Initially 4.8 ml of drier was substituted for the 4.8 ml of ink normally used in the test. The effect was so pronounced that the fountain solution was completely neutralised. Consequently lower levels of drier were tested to find a level that gave meaningful pH shifts. The level decided on was 0.006 per cent metal, based on the weight of the fountain solution.

The driers evaluated were as follows:

Drier type and amount (%)	Type of anion
PIP cobalt 6	tallate
Paste cobalt 7	naphthenate
Nuodex cobalt 6	naphthenate
NuXtra cobalt 12	mixed synthetic*
Octoate cobalt 12	octoate
Paste manganese 7	naphthenate
Nuodex manganese 6	naphthenate
NuXtra manganese 9	mixed synthetic*
Octoate manganese 6	octoate
Nuodex calcium 4	naphthenate
NuXtra calcium 6	mixed synthetic*
Octoate calcium 5	octoate

*C₈-C₁₂ branched chain synthetic acids

Two fountain solutions were evaluated: Rosos 726AV from Rosos Chemical Co. and Web Etch 34 from Varn Chemicals. These are identified as fountain solution 1 and fountain solution 2 respectively in the results.

Printing ink paste cobalt 6 per cent, paste cobalt 7 per cent and paste manganese 7 per cent were pre-diluted with mineral spirits to 3 per cent, 3.5 per cent and 3.5 per cent metal respectively to facilitate handling and mixing. NuXtra cobalt 12 per cent and octoate cobalt 12 per cent, were also pre-diluted with mineral spirits to 6 per cent metal to bring the concentrations closer to those of the solutions containing the other driers.

All tests were done in triplicate and the results quoted are the averages of the readings. The pH readings did not vary by more than 0.02, demonstrating the reproducibility of the test.

Results

Sample	Type of anion	Fountain solution 1		Fountain solution 2	
		pH	pH shift	pH	pH shift
Fountain solution 1		4.35			
Fountain solution 2		4.01			
PIP cobalt 6%	tallate	6.69	2.34	5.83	1.82
Paste cobalt 7%	naphthenate	6.40	2.05	5.27	1.26
Nuodex cobalt 6%	naphthenate	6.26	1.91	5.46	1.45
NuXtra cobalt 12%	mixed synthetic	5.52	1.17	4.79	0.78
Octoate cobalt 12%	octoate	5.51	1.16	4.79	0.78
Paste manganese 7%	naphthenate	6.43	2.08	5.33	1.32
Nuodex manganese 6%	naphthenate	7.51	2.16	5.55	1.54
NuXtra manganese 9%	mixed synthetic	5.13	0.78	4.76	0.75
Octoate manganese 6%	octoate	5.23	0.88	4.73	0.72
Nuodex calcium 4%	naphthenate	6.52	2.17	5.29	1.28
NuXtra calcium 6%	mixed synthetic	5.82	1.47	4.90	0.89
Octoate calcium 5%	octoate	5.65	1.30	4.87	0.86

Discussion

Refs. 1, 2

The results indicated some unexpected differences. The effect of drier metal type was not significant, whereas the effect of anion type was far more pronounced than expected.

The effect of the drier metals was not anticipated to be pronounced and these results confirm this.

The surprising anion effect may be due to the following: The synthetic acids used to prepare octoate and mixed synthetic driers are similar in structure. They are relatively short chain, branched (but ordered) aliphatic acids. Naphthenic acids are naturally occurring and as such are random in composition. They can vary from C₆-C₂₃ straight chain aliphatic or alicyclic acids¹. Tall oil fatty acids can be characterised as a mixture of approximately equal parts of oleic and linoleic acids² (both C₁₇ acids). It is possible that the larger organic groups of the naphthenic acids and tall oil acids may prevent the formation of organo-metallic bonds of the same strength as those produced with the synthetic acids. Consequently the inorganic acid in the fountain solution may react more easily with the metal thus becoming inactivated and causing a larger increase in the pH of the aqueous phase.

Conclusions

The type of anion used in the production of driers does influence the pH shift of acidic fountain solutions when the two are mixed. The effect seems to be independent of the metal portion of the drier. The newer synthetic acid driers seem to show the least pH shift and, as such, would be the preferred driers for lithographic inks.

It should be pointed out that driers alone are not the only cause of pH shift, the phenomenon is cumulative arising from many causes. This work, however, does enable a minimising of the effect due to driers.

Acknowledgements

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Coatings for galvanised steel in industrial building

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Summary

This paper deals with the qualities expected of organic coatings used on metal sheeting in the building industry. It looks at the basic requirements of the end user, architect, engineer, client, etc., the design and forming requirements of the sheeting, and the environment in which it is to be used, and finally, the options

open with regard to the choice of coatings. It is not intended to suggest coating systems, formulations, or draw comparisons, but purely to express the views of an applicator and fabricator, based on experiences which extend over some years.

Keywords

Processes and methods primarily associated with service or utility weathering

Types and classes of structures or surfaces to be coated
cladding
galvanised steel

Peintures pour tôle d'acier galvanisée et utilisée en bâtiments industriels

Résumé

Cet article traite des qualités que l'on demande à l'égard des peintures organiques destinées à être appliquées aux tôles métalliques utilisées à l'industrie de construction. L'auteur considère les besoins fondamentaux de l'utilisateur ultime, de l'architecte, de l'ingénieur, du client etc. aussi les besoins en ce qui concerne la forme et l'aptitude à cintrage de la tôle métallique, l'environnement auquel elle sera exposée et ensuite les

diverses possibilités concernant la sélection des peintures. L'auteur n'a pas l'intention de proposer des systèmes de peintures, ni des formulations, ni de faire des comparaisons, mais simplement d'exprimer les points de vue, basés sur l'expérience de quelques années d'un utilisateur de peintures qui est en même temps un constructeur de bâtiments industriels.

Lack für in industriellen Bauwerke angewandten galvanisierten Stahlblech

Zusammenfassung

Dieser Artikel befasst sich mit den Eigenschaften der organischen Beschichtungen hinsichtlich deren Anwendung auf Metallblech für das Bauwesen. Er zieht in Betracht die grundsätzlichen Voraussetzungen des Anwenders, des Architekten, des Ingenieurs und des Kunden etc., sowie die Entwurfs- und Verformungsvoraussetzungen, die von dem Metallblech gefordert sind, und ebenfalls die Umwelt unter der

dieser benutzt werden wird. Schliesslich zieht man in Betracht die Möglichkeiten hinsichtlich der Beschichtungsauswahl. Es gibt keine Absicht Beschichtungssysteme, bzw. Rezepturen, vorzuschlagen, oder Vergleiche zu ziehen, sondern die auf jahrelanger Erfahrung gegründeten Ansichte eines Lackanwenders und sowie eines Herstellers von industriellen Bauwerken, lediglich zum Ausdruck zu bringen.

Introduction

The ever increasing awareness amongst industry and coatings manufacturers of the high cost of corrosion, has led to the development of a large number of highly sophisticated coatings. This paper looks at the requirements of these "coatings for the eighties" from the viewpoint of an applicator of organic coatings, and fabricator of galvanised steel building products.

Why galvanised steel

There are a variety of reasons why metal, and in the context of this dissertation, sheet metal, is the preferred component of industrial buildings. In support of this, the following architectural record study carried out in the United States of America is offered, outlining the primary materials by percentage used in construction.

Table 1
*Architectural record study
primary materials used in construction,
by percentage*

Building type	Precast concrete	Metal	Glass/ metal grid	Brick	Others
Industrial	28.9	50.4	3.7	11.5	5.6
Commercial	27.1	26.3	17.1	17.5	12.9
Institutional	22.7	22.1	10.7	34.5	8.0
Others	46.0	15.9	6.4	20.6	14.3
Total	27.5	31.5	10.0	21.7	9.1

Cost, design versatility and formability, ease and speed of erection and material utilisation are obvious advantages. However, the main advantage of sheet metal in industrial building over most other materials lies in its

weight to strength ratio, for which reason it contributes the major portion of the claddings used in industrial buildings.

Among the various types of metals used for this purpose are galvanised steel, aluminium, steel alloys such as Cor-ten, stainless steel and alloy coated black steels. Of these, galvanised steel of various galvanising weights is the most widely used, and was thus chosen as the substrate for the coating referred to in this paper.

The properties desired of the coatings

It has been possible to obtain the results of surveys conducted amongst architects, engineers and owners of industrial buildings in North America and Europe. The object of these surveys was to determine, in order of preference, the properties they desired of protective coatings. Table 2 shows the results of these surveys, which are largely corroborated by H. H. Robertson's marketing team investigations.

Table 2

Results of surveys amongst architects, engineers and owners of industrial buildings who were asked: When you are deciding on the type of coating to specify for metal wall panels, what product features are most important to you?

Product features	Ranked first in importance (%)
Colours standard	16.5
Colour retention/stability	29.1
Corrosion resistance	8.9
Self cleaning	0.6
Gloss retention	0.6
Chalk resistance	1.9
Bending capability	0.6
Adhesion to substrate	11.4
Resistance to atmospheric pollutants	5.1
Impact resistance and flexibility	4.4
Longevity of coating	31.7
Hardness of coating	1.3
Coating thickness	

From Table 2 can be seen what may be considered "the architect/engineer's view".

Table 3

Coating system requirements in order of preference
1. Longevity of coating
2. Colour retention/stability
3. Colours (standard) - variety and availability
4. Adhesion to substrate
5. Corrosion resistance
6. Resistance to atmospheric pollutants

On consideration of the requirements in Table 3, it is possible that numbers 4, 5 and 6 could be classified with 1, thus further stressing the importance placed on coating durability.

Table 4

Results of surveys where the question posed was: When deciding on the brand of coating to specify for metal wall panels, what product features are most important to you?

Product features	Ranked first in importance (%)
Availability	17.3
Colours (special)	14.1
Colour match	10.9
Cost	14.7
Texture	2.6
Flame spread rating	2.6
Guarantees/warrantees	13.5
Reputation of manufacturer	32.7
Technical assist. from panel/paint manufacturer	5.8

The environment

Having established the required properties of the coatings for the substrate, it is now necessary to look at the environment in which these coatings are to be used. In general there are three main environmental factors which will affect the coatings:

1. Ultraviolet

This results in chalking, colour change and erosion of the coating in a continuous cycle, an important factor to be considered in South Africa where a high degree of UV is experienced.

2. Moisture/rainfall

High temperatures and high humidity, such as conditions found on the South African coastline, accelerate the erosion of the coating.

3. Special climatic conditions

The climatic conditions governing metal cladding performance have been reduced to four major categories:

- | | |
|----------------|-----------|
| (a) industrial | (c) urban |
| (b) coastal | (d) rural |

Each of these categories can be divided into two main areas of influence, i.e. the primary zone and the secondary zone. The above categories can be defined as follows:

Industrial atmospheres

That area contaminated by by-products or emissions foreign to normal atmosphere as a result of heavy industrial activity. The primary zone of that area will extend to 2 kilometres from the centre of the industrial complex and will represent unusual corrosion hazards requiring a high degree of protection. Metal cladding applications to be found in this area include, amongst others:

- | | |
|---------------------------|------------------|
| fertiliser plants | smelters |
| foundries | explosive plants |
| aluminium pot lines | chemical plants |
| petro-chemical production | tanneries |
| mining operations | |

The secondary zone is an area of moderate corrosion and

would extend a further 4 kilometres, at which point corrosive effects would probably be reduced by 80 per cent.

Coastal atmospheres

This is defined as that area within 10 kilometres as measured at right angles from the sea. The salt concentration in the atmosphere remains significantly above normal levels within this range. Metal cladding used in the primary zone of this area, which extends to approximately 2 kilometres inland, should be highly corrosion resistant. Moderate corrosion takes place in the secondary zone, which extends a further 12 kilometres inland to where there is a salt concentration decrease in the sea-borne air of approximately 80 per cent. The total area of coastal influence can extend to 100 kilometres inland.

Urban atmospheres

Defined as densely populated areas where the corrosion promoting atmosphere is created through vehicular exhaust emission, light industrial factory exhausts, fossil fuel power generation and oil and gas heating. The principal contaminants in this area are sulphur dioxide, nitrous oxides, carbon dioxide and carbon monoxide.

The degree of protection required can be related to the amount of smog in a given urban area.

Rural atmosphere

Can be defined as that area where the sole consideration for metal cladding protection is the typical prevailing weather conditions. The three principal elements of weather considered to have a deleterious effect on protective coatings are: solar radiation (UV), humidity (condensing humidity is considered more deleterious than rainfall) and temperature.

Before continuing, it is well worth noting a fairly recent phenomenon which is currently causing concern overseas. This phenomenon, referred to as "acid rain", is due to the increased consumption of fossil fuels, and has begun to seriously affect rainfall, i.e. the acidity level is continually increasing. It was first brought to the attention of the world by the Scandinavian countries. Scandinavia does not have a lot of heavy industry but does have many lakes, fish and fishermen; however, it was noticed that the pH of the lakes was falling and that the fish were dying.

Normal rainfall has a pH of 5.6, it absorbs CO₂ as carbonic acid and is a naturally buffered solution, which means in essence that it is difficult to change the pH of rainfall. But when lakes reach a pH of 4, fish die, and in the Scandinavian lakes, which have no limestone to neutralise the rainfall, pHs of 4 and less have been reached. This is almost certainly caused by the emissions from burning fossil fuel. Six million tons of SO₂ per annum is released from fossil fuels in the UK and 10 million tons per annum from the Rhur valley and Eastern Europe; these emissions moved by air currents over Scandinavia, it is suggested, result in acid rain.

The same situation has been noted in North America where emissions of 75 million tons of SO₂ per annum occur, and whose coal consumption is expected to increase three-fold in the next two years.

Further evidence indicates that this type of pollutant has affected trees and other plants, and historic buildings

such as the Acropolis and the Taj Mahal, which are basically being dissolved, thus it would follow that even in South Africa, the rural areas can no longer be considered as being entirely free from corrosive elements, a factor worthy of future consideration.

The hidden factor

At this point, having established the end user's requirements (the customer factor), and the environmental and climatic conditions of use (the environmental factor), most chemists or others would start formulating or selecting coatings. There is, however, a further important factor that is generally forgotten, which, for want of a better description, will be called the "hidden factor".

The hidden factor is a collective description for numerous practical situations which will occur before the coated product has a chance to prove itself. Some of these are:

- 1 Forming and fabrication machine cleanliness and handling. In many cases painted sheeting is treated just like galvanised sheeting, and in this process the coatings are damaged and scratched, thus leaving the metal substrate vulnerable to corrosive attack.
- 2 During erection, the coated products may be dragged across one another and walked on again causing coating damage.
- 3 Building design, in many cases the designer will expect the impossible from a coating under conditions of blatant bad design.
- 4 Coated sheeting is rollformed into various profiles then packed and shipped to site where it may be left flat on the ground in the rain and sun for months on end. Moisture gets between the sheets, forms a hot box, and the coating suffers.

These situations will occur despite all efforts to control them, so they must be considered in the selection of coatings.

The protective coatings

An examination of the coatings presently available for use in industrial building, which is where the coated product is to be used, indicates that in general, these coatings will perform similarly in a coastal environment, therefore these two conditions can be linked.

It is known that the success of any protective coating relies on a high degree of surface preparation, pretreatment and coating application. The substrate is galvanised steel, and as the indifferent results of *in situ* applied coatings are well known with this substrate, these types of coatings can be ruled out as not meeting the requirements. The alternatives, therefore, lie in factory applied or coil coating materials of which the main types used are:

Thermosetting acrylics, siliconised acrylics, oil free polyesters, silicone modified polyesters, PVF₂, straight epoxies, vinyls, plastisols and organosols.

Table 5 illustrates the properties of each of the above types of coatings in terms of the requirements already listed.

Table 5
Comparative coating performance chart

General coating type	Retention of		Longevity of coating		Adhesion to substrate		Hidden factor		Hardness	Pressure marking	Cost
	Colour	Gloss	Industrial corrosion resistance	Chemical resistance	Adhesion	Flexibility	Mar resistance	Humidity resistance			
Thermosetting acrylic	1	4	2	2	1	2	1	1	2	2	medium
Siliconised acrylic	1	4	2	2	2	3	2	2	2	2	high
Oil free polyester	1	2	2	2	1	2	2	1	1	2	medium
Silicone modified polyester	1	1	2	2	2	2	2	1	2	2	high
PVF ₂	2	1	1	1	2	1	3	1	2	2	v. high
Epoxies	3	4	1	1	1	2	1	1	1	1	high
Solution vinyl	3	4	2	2	1	1	2	1	2	2	med.-high
Plastisol	3	3	1	1	2	1	3	1	3	3	low
Organosol	3	3	1	1	1	1	3	1	2	2	low

1 = excellent 2 = good 3 = fair 4 = poor

It can thus be concluded from Table 5, that in terms of corrosion protection, the epoxies are first, followed by the solution vinyl and then the plastisols and organosols. All these coatings types however, have a major drawback in that colour and gloss retention are fair to poor.

Of the coatings, the next in line which offer good all round performance are the PVF₂, SMPs and oil free polyesters, in that order. These are generally used as finish coats, and although laboratory tests may show good results, in practise the lower coating thicknesses applied do not provide the long term protection required in heavy industrial and coastal conditions.

H. H. Robertson has, over the past 15 years in South Africa and overseas, maintained a fairly extensive natural exposure programme in conditions of coastal, industrial, urban and rural areas. Based on observations of the coatings in these conditions, the following comments on the coatings listed have been made:

Acrylics – thermosetting and siliconised

This class of coating was used in the early days of coil coating. Very high chalk rate, ASTM rating after 2 years 5–6. This caused apparent colour change and led to complaints of fading. Although self cleaning to some degree, the coating does tend to be slightly thermoplastic and suffer from dirt retention.

Oil free polyester

Developed at much the same time as the silicone modified polyester, and although it exhibits good formability and high gloss, it is generally used for appliance and interior finishes due to its lower chalk resistance than the SMP.

Silicone modified polyester

In South Africa a 30 per cent silicone modification is used, whilst in North America a 50 per cent modification is fairly common. Local experience of the two is that the difference between them is little. Chalk resistance is considered very good, rating 8 after 10 years exposure at 45° north in Johannesburg. Aesthetically, a good economic coating for industrial buildings. In practise, like the previously mentioned coatings, protection under severe conditions could possibly extend over 5 years, in many cases less, at which point maintenance painting would be required. If left, replacement would be necessary after 8-10 years.

PVF₂

Has superior chalk resistance to the SMPs, dirt retention is less; however, the difference in cost does not justify the extra performance achieved when used on industrial buildings. Although the author has no local site experience of the performance of this coating he would expect it to be marginally better than that of SMPs.

Epoxies

Seldom if ever used alone.

Solution vinyl and organosol

No local history available and not used much in South Africa. It is expected that the high UV experienced in South Africa would render these coatings unsuitable.

Plastisol

This type of coating is normally used as a high build

coating at dry film thicknesses of 100 microns plus. They have poor flow properties during application, tend to be soft, and whilst they have excellent corrosion resistance properties, once damaged underfilm corrosion becomes a problem. They are also used only when aesthetics are not a consideration, as they cannot be overcoated with the above type of final coats.

H. H. Robertson has been engaged in the research, development and production of protected metal walls and roof systems over a period of some 70 years and it may be of interest to examine the progress made over this period.

The first product was a material produced in 1906 which comprised basically a bituminous coated black steel sheet. The problem with this product was that:

- (a) one could have any colour provided it was black
- (b) the length of the sheet was limited
- (c) fire risk

The first colour coated sheet was developed and produced in 1950. This product consisted of black steel onto which molten zinc was applied. A layer of bitumen impregnated felt was rolled onto the molten zinc surface and the whole allowed to cool. The finish was supplied by 150 microns of a hot melt polyester colour coat.

The latest development has combined the best properties of the previously listed coatings, viz., it comprises a galvanised steel substrate coated with a 75 micron layer of epoxy especially modified with proprietary patented flexibilisers, which enables increased forming flexibility from a coating with excellent inherent corrosion resistance and adhesion properties. This is followed in South Africa with a 20 micron film of 30 per cent silicone modified polyester, this finish coat provides the aesthetic properties desired from the finished product. The three layers of protection to each side of the steel core unite to form an exceptionally strong barrier to the forces of corrosion.

Coatings of the eighties

Refs. 1,2

There is no doubt that the possibilities of solventless coatings or water based coatings will now be considered, which is natural considering the current oil situation, and the greater ecological pressures being placed on industry.

In this regard, attention must be drawn to a series of excellent articles written by Joseph Ziegeweid^{1,2} whose comments on feasibility and machine requirements are very pertinent.

The trend overseas in coil coating, and to a lesser extent in South Africa, is towards being able to coat at ever increasing speeds. A new plant in America is now coating at 200 metres/minute, at which speed great demands are made on flow and cure of the coatings.

In addition, building design is towards lower pitched roofs, subjecting the coatings to higher solar radiation levels (chalking is 3 times greater at 45° than at 90°), and higher dirt and corrosive deposit collection.

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Maleopimaric acid from gum rosin of *Pinus roxburghii*

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Summary

Ref. 3

Preparation of maleopimaric acid (MPA) has been reported from crude gum, gum rosin of other *Pinus* species, and tall oil. However, no work is reported on the gum rosin of *Pinus roxburghii* (Indian Chir Pine). Maleopimaric acid was prepared by the procedures cited in the literature and also by modifying

the procedure of Lawrence and Eckhardt³. It has been shown that this procedure is more convenient and gives pure product with a better yield. The effects of time, temperature and solvents were investigated.

Keywords

Raw materials used in the manufacture or synthesis of ingredients for coatings

abietic acid
pimaric acid
rosin

Processes and methods primarily associated with manufacturing or synthesis

maleinization

L'acide maléopimarique obtenu de la gomme-résine de *Pinus Roxburghii*

Résumé

On a déjà fait mentionne de la préparation de l'acide maléopimarique (MPA) à partir de la gomme brute et de la gomme-résine d'autres espèces de pinus, et également à partir de résine liquide. Toutefois, on n'a fait aucune mentionne d'études sur la gomme-résine de *Pinus Roxburghii* (Indian Chir Pine). On a préparé l'acide maléopimarique selon la procédure

citée dans la littérature et d'ailleurs par une modification de la procédure de Lawrence et Eckhardt (1953). On a démontré que la procédure ci-décrite est plus commode et assure en même temps un produit pur dont le rendement est supérieur. On a étudié l'influence qu'exercent la durée et la température de la réaction, et également celle d'autres solvants.

Maleopimärsäure aus dem Gummiharz von *Pinus Roxburghii*

Zusammenfassung

Die Herstellung von Maleopimärsäure wird aus rohen Gummi und Gummiharz von anderen Kiefernarten und ebenfalls von Tallöl schon berichtet. Jedoch wird keine Untersuchung des Gummiharzes von *Pinus Roxburghii* (Indian Chir Pine) berichtet. Maleopimärsäure wird laut der Durchführung, die in der Fachliteratur zitiert wird und ebenfalls laut einer Modifika-

tion der Lawrence and Eckhardtschen Durchführung (1953) hergestellt. Es wurde gezeigt dass die vorliegende Durchführung günstiger ist und dass sie ein reines Produkt und ebenfalls einen besseren Ertrag gewährt. Der Einfluss der Reaktionszeit und -temperatur, sowie verschiedener Lösungsmittel untersucht wurde.

Introduction

Refs. 1-23

Abietic type rosin acids readily react with maleic anhydride to form adducts of the Diels-Alder type¹. However, the Diels-Alder type of addition is possible with levopimaric acid but not with abietic acid as the reaction does not take place with conjugation in two rings. Abietic type acids, e.g. palustric, neo-abietic and abietic acid, isomerise to levopimaric acid at elevated temperature, which reacts with maleic anhydride to give maleopimaric acid (MPA) (Figure 1).

A literature survey has revealed that MPA has been prepared by various workers from pine oleoresin², gum rosin³ of various *Pinus* species and tall oil⁴, but no work has been reported on the preparation of MPA from the oleoresin and gum rosin of *Pinus roxburghii* (Indian Chir Pine). The composition of the oleoresin and rosin of *Pinus roxburghii* is somewhat different from that obtained from other *Pinus* species (tables 1 and 2). MPA was prepared from the pine oleoresin and gum rosin of *Pinus roxburghii*

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Table 1
Typical composition of pine oleoresins

Gum composition	<i>P.roxburghii</i>	<i>P.palustris</i> ⁵	<i>P.elliottii</i> ⁵
Water (%)	3–5	3 or less	3 or less
Turpentine (%)	14–20	20	20
Rosin (%)	74–75	76 ± 1	76 ± 1
Resin acid total (%)	65–67	65–67	65–67
Levopimaric acid (%)	15–17	21–26	17.5–18.8

Table 2
Typical composition of gum rosins

Gum rosin composition	<i>P.roxburghii</i>	<i>P.palustris</i> ⁶	<i>P.elliottii</i> ⁶
Abietic acid (%)	33	18	19
Neo-abietic acid (%)	14	15	16
Palustric acid (%)	6	35	25
Dehydro-abietic acid (%)	6	8.6	7.2
Dextropimaric acid (%)	5	4.8	5.5
Iso-dextropimaric acid (%)	18	t	t
Acid number	165	162	161

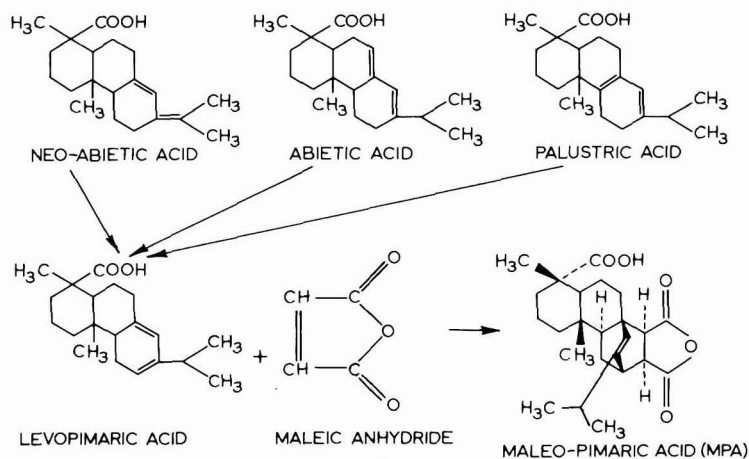


Figure 1.

using the procedures already mentioned in the literature and also by modifying the procedure of Lawrence and Eckhardt which produced improved results.

Generally, MPA is not separated from the rosin-maleic adduct, which has important commercial uses⁷. In the last decade, pure MPA and its derivatives have been studied in great detail and many new useful products have been obtained e.g. vinyl polymers and copolymers^{8,9}; polyester resins¹⁰, water soluble alkyd resins¹¹, synthetic resins (polyester imide)^{12,13}, gelatin coatings for films¹⁴⁻¹⁶, poly (imide-amide) resins^{17,18,19}, and biochemically and pharmacologically active products^{20,21}. Therefore, the authors investigated the preparation of MPA from *Pinus roxburghii* for indigenous use.

Earlier methods of the preparation of MPA were tedious and cumbersome, e.g. Hovey and Hodgins

method²⁴ required the use of pure resin acids, Fleck²² and Cox²³ started with pine oleoresin^{22,23}, Wieger¹⁰ prepared MPA from an isopropyl ether solution of maleic adduct of rosin, Lawrence and Eckhardt³ used carbon tetrachloride as the solvent for the maleated rosin in the separation of MPA, Gonis and Slezak⁴ refluxed tall oil rosin, maleic anhydride and glacial acetic acid. The authors prepared MPA from gum rosin of *Pinus roxburghii* following the procedures of Lawrence and Eckhardt, and Gonis and Slezak. It was observed that the yield was good in the case of the carbon tetrachloride procedure but the product was not very pure (m.p. 216–217°C) and its colour was slightly yellow. MPA obtained by the glacial acetic acid method was pure (m.p. 225–226°C), however, it required a long time for completion of the reaction. The procedure of Lawrence and Eckhardt has been modified to give a better yield and the product so obtained was very pure (m.p. 228–229°C). Also, the time required was much less than with the above two methods.

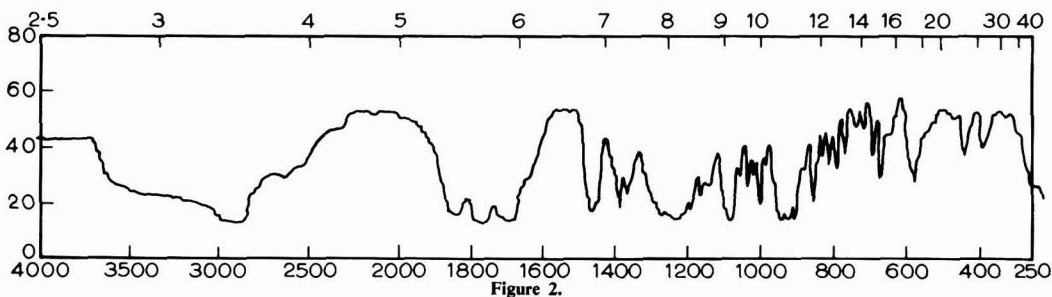


Figure 2.

Experimental

Refs. 3, 4

Reagents

Gum rosin (WW grade) supplied by ITR Co. Ltd,
 Maleic anhydride LR Grade (HPC)
 Carbon tetrachloride GR grade (SM Chemicals)
 Glacial acetic acid GR grade (SM Chemicals)

Procedure*(a) Glacial acetic acid procedure (Gonis et al.⁴)*

The reflux time varied from 10 to 30 hours. Maleic anhydride percentages used were 15, 17 and 20 (on the weight of rosin). Glacial acetic acid volume to weight ratios (ml/g of rosin) were 5.5, 6.75 and 7.5. Yields of MPA varied between 20-28 per cent by weight.

(b) Carbon tetrachloride procedure (Lawrence and Eckhardt³)

Maleic adducts were prepared from rosin (WW grade) at 180-200°C. Reaction time was 60 to 90 minutes. Maleic anhydride percentages used were 15, 17 and 20 (on the weight of rosin). Carbon tetrachloride volume to weight ratios (ml/g of rosin) were 3.5, 3.75 and 4.0. Yields of MPA varied between 30-35 per cent by weight.

(c) Improved method

For the author's method the following procedure was followed, gum rosin (100 g) and maleic anhydride (20 g) were heated at 190-200°C for 45 minutes, when crude maleopimaric acid was formed. To 75 g of hot crude MPA, 300 ml of carbon tetrachloride was added, the resultant mixture was vigorously stirred when the CCl₄ solvate of MPA separated. After 15-20 minutes, the CCl₄ was removed by vacuum filtration. The remaining solid was air dried and washed several times with cold glacial acetic acid. It was then dried in a vacuum oven at 110-130°C for 4 hours. Yield: 29 g of pure MPA, found: m.p. 228-229°C, acid number of the acetone-water solution 399, optical rotation (α)_D²⁵ 28.3° (CHCl₃). Literature values: m.p. 226-227°C, acid value 399-420, (α)_D²⁵ 29.6°.

The percentage yield with this method was 38.6, which is superior to the yields obtained by the two earlier methods.

IR values Found value: $\bar{\nu}_{\text{max}}$ 1845, 1780, 1710 cm⁻¹ (Figure 2).

Literature value: $\bar{\nu}_{\text{max}}$ 1845, 1779, 1710 cm⁻¹

The infrared spectra were measured with a Perkin Elmer Spectrophotometer.

Acknowledgement

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Ultimate strength of paint films

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Keywords

Properties, characteristics and conditions primarily associated with

materials in general

strength

bulk coatings and allied products

pigment vehicle reaction

pigment volume concentration

Prolegomen

Refs. 1-13

Though much theoretical work is devoted to the prediction of the Young's (elastic) moduli behaviour of filled polymer systems, also called composites, practically nothing can be found about their tensile strength versus filling. The same statement is valid for paint films. Some recent papers reviewed the subject^{1,2,3} and showed the complexity of the problem.

The ultimate properties of composites cannot be explained by a simple volume effect as suggested for example by Smith⁴, Nielsen⁵, Nicolaï and Narkis⁶. Many other fundamental factors must be taken into account, e.g. shape of the solid particles, size and size distribution, acid-base interactions between binder and particles etc. In addition physical defects such as flocculation, voids and dirt are often present which, owing to the thickness of paint films, are deleterious to the mechanical properties. Furthermore, the rupture is a very complex mechanism.

Another fact that should be mentioned is that most of the theories recently proposed are obtained from work on the reinforcement of polymers by fibres⁷⁻¹¹. Amongst which the following equations are cited:

$$\sigma = \frac{c\phi}{r_f} \left(m + \frac{v^2}{m} \right) + \sigma_0(1-\psi) \dots \dots \dots (1)$$

and
$$\sigma = \frac{1}{d} \tau + \sigma_0(1-\psi) \dots \dots \dots (2)$$

where: σ, σ_0 = tensile strengths of the composite and the unfilled resin respectively

r_f = the radius of the fibre

c = parameter depending on the fibre's orientation

m = the mean length of the fibre

v = its standard deviation

ϕ = parameter related to the fibre length/fibre diameter

l/d = the fibre length/diameter ratio

τ = fibre/matrix bond strength

ψ = volume fraction of the fibre in the composites

It is worth mentioning here the remarkable paper of Leidner and Woodhams¹¹ who have extended the well-known theory on glassfibre polymer reinforcement of Outers and Kelly^{12,13} to spherically shaped solid particles (beads). In their work these authors made the following assumptions in the case where good adhesion exists between binder and solid particles (designated hereafter, pigments or fillers):

- The mechanical properties of the binder may be modified by the presence of solid inclusions.
- The stress is transferred to the pigment in two ways: through shear stresses at the binder/pigment interface and through the component of the tensile stress parallel to the force (in uniaxial stress-strain experiments) at the binder/pigment interface. The maximum stress in the solid particle is reached when the shear stress in that direction reaches the ultimate shear strength of the binder and the tensile stress at the interface attains the pigment/binder bond strengths.
- The stress in the pigment is the sum of a stress transferred by shearing and a stress transferred by the component of the tensile stress parallel to the deformation at the binder/pigment interface.
- The maximum stress transferred by the component of the tensile stress is the same in any particular position on the spherical pigments and equal to the strength of the binder/pigment adhesion σ_a .
- Due to stress concentration, the average tensile stress in the binder is usually lower than the shear stress at the pigment/binder interface. The stress concentration factor was defined as:

$$S = \frac{\text{average tensile strength in binder at breaking point}}{\text{tensile stress at binder/pigment interface (= } \sigma_a)}$$

- The tensile strength of the composites is the sum of the load supported by the matrix, and by the particle at the moment of rupture. With these assumptions the mathematical treatment leads to the following expressions:

for high PVC
$$\sigma = (\sigma_0 + 0.83\tau) + \sigma_0 S(1-\psi) \dots \dots (3)$$

for low PVC
$$\sigma = 0.83p\alpha + K\sigma_0(1-\psi) \dots \dots (4)$$

The PVC which defines the limit between low and high PVC values is given by

$$\psi^* = \frac{K\sigma_o - \sigma_a S}{\sigma_o + 0.83\tau + K\sigma_o - \sigma_a S - 0.83\alpha\epsilon} \quad (5)$$

In equations 3-5:

- σ = ultimate strength of the composite
- σ_o = ultimate strength of the binder without pigments
- σ_a = adhesion bond strength at pigment binder interface
- τ = shear strength of the binder without pigments
- S = stress concentration factor
- K = the relative change of the strength of the binder due to the presence of the pigment
- $\alpha\epsilon$ = the frictional stress at the pigment/binder interface when there is no adhesion, or at very low PVC
- ψ = pigment volume fraction

Equations 3-5 show that for $\psi > \psi^*$, σ is a linearly increasing function of ψ , and that for $\psi < \psi^*$, σ is a linearly decreasing function of ψ .

If there is no adhesion between binder and pigment, Equation 4 is applicable for any values of ψ .

When $\sigma_a < \tau$ debonding occurs; although there is adhesion it is weak. Unfortunately, none of these equations (1-5) are complete since it is well-known that:

- σ is not a continuous increasing function of ψ , but decreases markedly after it has attained the critical pigment volume concentration.
- There exists an adsorbed layer of polymer on the pigment particles which is not taken into account in the equations mentioned.

From references 1-3, the concept of effective thickness of the adsorbed polymer layer - when good adhesion exists - is somewhat arbitrary, due to the fact that the thickness of the boundary layer with properties that differ from those in the bulk, depends mainly on which property is taken into account. Consequently, it may be concluded that for a given system the value of the boundary layer thickness will depend upon the methods used for its determination.

From a mechanical point of view, a paint film may be represented formally by a model consisting of three elements: solid particles, a binder (polymeric material crosslinked or not) and an interfacial layer of adsorbed resin. It has been indicated that the polymeric component in the adsorbed layer always has properties which differ from those of the bulk. It is easy to conceive that the binder properties vary continuously from the pigment surface into the bulk and that no marked frontier in the binder properties exists. It can be expected that the interfacial layer will extend in the bulk over a certain thickness, δ , but whose value will depend on the method of determination used. These are the reasons why an adequate relationship to describe the experimental results is difficult to find. However, a relationship between the ultimate strain and the pigment volume concentration was established³:

$$\epsilon/\epsilon_o = 1 - (\psi/\psi_c)^d$$

- where: ϵ , ϵ_o = ultimate strain of pigmented and unpigmented film respectively
- ψ_c = critical pigment volume concentration

It was also shown that ψ_c is a function of the number of acid and/or basic sites present on the pigment surface, and on the extension rate.

The aim of this work was to correlate the ultimate strength with some measurable properties of pigments and binders, and more particularly, their acid/base characters.

Experimental

Refs. 3,15

Binders

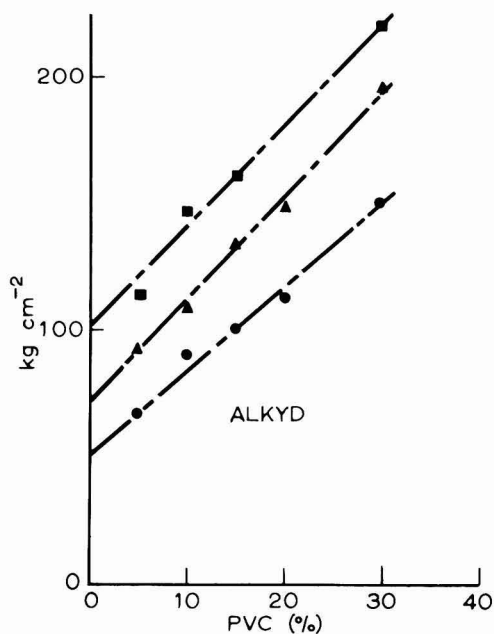
Two binders were used, both having a Tg near the temperature test (20°C), a solvent soluble thermoplastic acrylic (Tg = 22°C) and a long oil alkyd resin (Tg = 19°C). The Tg values were measured by DSC (Dupont 900) at a rate of 5°C/min from -80°C up to +100°C.

Pigments

Four titanium dioxides of different surface treatments, three iron oxides (brown, red and yellow) and a microtalc were used, all of which can be considered approximately spherical. Their physical and chemical characteristics are given elsewhere³. Their surface properties are given in Table 1, and were determined in accordance with the works of Benesi and Tanabe¹⁵. The precision is 5 per cent.

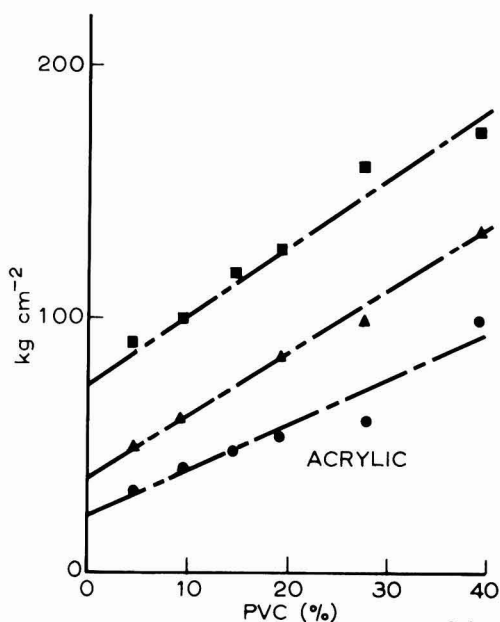
Table 1
Acid-base characterisation of the pigments investigated

Pigments	Number of acid sites $\times 10^{-2}$ meq/cm ²	Number of basic sites $\times 10^{-2}$ meq/cm ²	Sum of basic and acid sites $\times 10^{-2}$ meq/cm ²
TiO ₂ No. 1	0.182	0.664	0.846
No. 2	0.165	0.512	0.677
No. 3	0.148	0.358	0.506
No. 4	0.089	0.595	0.684
Red iron oxide	0.340	0.258	0.598
Brown iron oxide	0.099	0.172	0.261
Yellow iron oxide	0.110	0.192	0.302
Microtalc	0.106		0.106



PAINTS WITH TiO_2 No.1 : σ VERSUS PVC FOR DIFFERENT STRAIN RATES

● 0.1
▲ 0.4 min⁻¹
■ 2.0



Film preparation

Paints of different PVCs (5, 10, 15, 20, 30 and 40 per cent) were prepared using porcelain ball mills grinding to a fineness of 8 on the Hegmann gauge. The films were bladed by means of an IVP filmograph on rectified glass plates, covered with tinfoil and allowed to dry, they were conditioned, one year for the alkyd paints and six months for the acrylic paints (21°C, 60-65 per cent RH). The films were cut into strips (1.5 × 10 cm) and detached from the metal substrate by amalgamation. The mean thickness of the strip was 50 μm.

Tensile tests

The specimens were submitted to uniaxial deformations (traction) until rupture occurred. The instrument used was a tensile machine (Instron TM-M) and the tests were carried out at three strain rates: 0.1, 0.4 and 2.0 cm⁻¹. The initial length between the jaws was 5 cm. The results represent arithmetic mean values of at least eight measurements. The mean square deviations are 13.9 kg/cm² for alkyd paints and 12.8 kg/cm² for acrylic paints (figures 1 and 2).

Results and discussion

Refs, 8, 11, 14

All the experimental results showed that the curves σ versus ψ can satisfactorily be described by straight lines having positive slopes (see figures 1 and 2 as examples). No negative parts were observed (equations 3 and 4), but this by no way means that they do not exist. However, the values of σ extrapolated at $\psi = 0$ are so close to σ_0 that it can be assumed that the decreasing part does not exist or can be neglected. Theoretical curves

calculated by Leidner and Woodhams¹¹ reveal that in this case the adhesion strength between the pigment and the binder is as high as the tensile strength of the binder itself or even higher. Consequently, it can be inferred that the rupture will take place in the polymer phase. Electron microscopy and electron spin resonance spectroscopy studies showed that, in general, when good adhesion between pigments and binder exists and the T_g of the film lies below or near the test temperature, the rupture occurs in the polymeric phase. The experimental results shown in this paper confirm these observations.

The establishment of a theory taking into account the three phase model of a film seems to be an unresolvable problem at the present, owing to the lack of information on the way mechanical properties vary from the particle surface through the bulk. Only hypotheses and assumptions can be made today.

It can be reasonably assumed that, except in a very thin layer of truly immobilised molecules or parts of molecules, around the particles, the properties of the absorbed layer must not be too different from those of the bulk. This assumption can be validated by the fact that no marked differences in the T_g values of filled and unfilled films were observed. The maximum difference that has been measured was +2.2°C, the mean value being +1°C.

So, until more knowledge on the properties of the absorbed layer is available, it is more convenient, as a first approximation, to describe paint film properties as a two component model: the solid particles and a polymeric phase having mean mechanical properties somewhat different from those of the unpigmented binder.

Considering again the work of Leidner and Woodhams which, in the author's opinion is at present the most com-

Table 2
Coefficients K and σ_a calculated for Equation 8 as examples

Paints	Strain rate cm ⁻¹	σ_0 kg.cm ⁻²	K σ_0 kg.cm ⁻²	$\sigma_a - 0.6 K\sigma_0$ kg.cm ⁻²	K	σ_a kg.cm ⁻²
Alkyd TiO ₂ No. 1	0.1	48	53	298	1.10	266
	0.4	50	67	292	1.30	252
	2.0	78	90	304	1.15	250
Acrylic TiO ₂ No. 1	0.1	17	14	289	0.82	280
	0.4	30	25	312	0.83	297
	2.0	55	45	341	0.82	314

Table 3
Calculated values of K and σ_a from Equation 8

Pigment	Alkyd paints		Acrylic paints	
	K	σ_a kg/cm ²	K	σ_a kg/cm ²
TiO ₂ No. 1 No. 2 No. 3 No. 4	1.20	256	0.82	297
	1.54	219	0.69	270
	1.25	187	1.25	202
	1.56	261	1.06	127
Red iron oxide	1.39	235	0.67	335
Brown iron oxide	1.09	264	1.30	285
Yellow iron oxide	1.30	265	1.55	243
Microtalc	1.03	144	1.25	206

plete approach to the problem, and taking into account the experimental results, Equation 3 can be somewhat modified.

Since in all cases studied, ψ^* (Equation 5) is very small, probably less than 0.02, the extrapolated values of σ from equations 3 and 4 to $\psi = 0$ must be very close to each other. Therefore, they can be considered equal. With this assumption Equation 3 may be rewritten as:

$$\sigma = (\sigma_0 + 0.83\tau)\psi + K\sigma_0(1-\psi) \dots \dots \dots (6)$$

or
$$\sigma = (\sigma_0 + 0.83\tau - K\sigma_0)\psi + K\sigma_0 \dots \dots \dots (7)$$

Assuming that $\tau = 1/2 K\sigma_0$, a generally accepted assumption, Equation 7 becomes:

$$\sigma = (\sigma_0 - 0.6 K\sigma_0)\psi + K\sigma_0 \dots \dots \dots (8)$$

However, it must be emphasised that in reality $K\sigma_0$ and consequently τ may vary with ψ , but in an unknown manner. For the sake of simplicity and as a first approximation they will be considered as constants. The determination of the coefficients in Equation 8 were made by means of the least squares technique. This enables the calculation of K and σ_a . As expected $K\sigma_0$ and $(\sigma_a + 0.83\tau - K\sigma_0)$ are strain rate (time) dependent since the binders are viscoelastic materials. Nevertheless, the calculated values K and σ_a are quite constant for a given system (e.g. see tables 2 and 3).

This was also expected since σ_a depends only on the

type of interaction between pigments and binders (universal, hydrogen bonding, etc.).

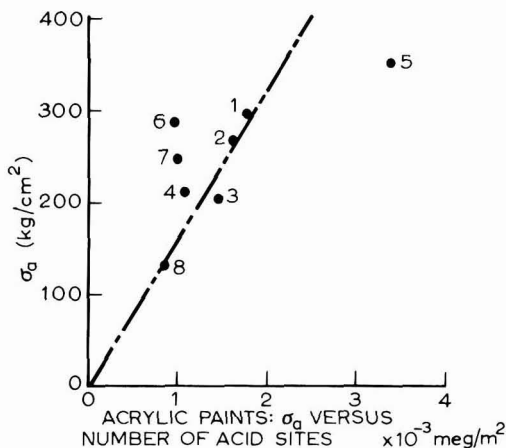
From Table 3 it can be seen that the factor K differs from unity. This means that the properties of the binder are modified by the addition of solid particles. Hajo and Toyashima¹⁴ showed that the presence of solid spherical particles weakens the polymer and that the weakening can be expressed by:

$$\kappa = a + bd^{-1/2} \dots \dots \dots (9)$$

where: a and b are constants and d the particles diameter. Since pigments rarely have uniform diameter, it can reasonably be assumed that the strength of the pigmented polymer is principally controlled by the largest one. For example¹¹, in polyester filled with glass beads, the factor K varies from 0.7 to 0.95 for particle diameters ranging from 0.6 to 0.04 mm. It follows, that for the particles used in this investigation, K must be close to 1, since pigments have diameters smaller than 10⁻³ mm. For all paints though, except three acrylics, it was observed that the values of K were greater than 1. One possible explanation is that some low molecular weight species (the most polar) were adsorbed preferentially onto the surface of the pigments, resulting in a stiffening of the remaining binder. This is in accordance with results obtained by GPC and by the small increase observed in the Tg.

Concerning the three cases for which K is smaller than 1, it is supposed (but not confirmed) that some clusters must have been formed during film formation.

From the curves σ_a versus the acid-base characteristics



of the pigment surfaces (figures 3 and 4), it can be seen that the experimental points lie along straight line curves with positive slopes, at least for the range of spherical assimilated pigments (1, 2, 3, 4, 5 and 8). This indicates that σ_a follows a first order equation:

$$\sigma_a = a + bs \quad (10)$$

where: a and b are constants and s the number of sites concerned. The experimental values obtained with pigment 6 (forming chaplets) and pigment 7 (needle like) lie well above the curve in both cases: it is well known that these shapes have a greater reinforcing effect than spherical particles. From figures 3 and 4 it can be seen that the curves have different aspects. The curve related to the acrylic paints passes through the origin ($a = 0$), whilst with the curve related to the alkyd paint $a \neq 0$.

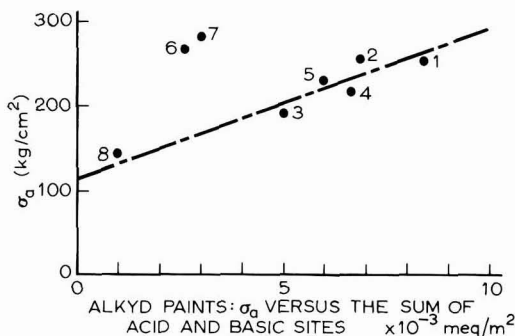
Furthermore, the slopes are different, the slope is greater for the acrylic than for the alkyd paints. The exact reasons of these differences in behaviour are not yet fully understood, complementary work on this topic is under way at the moment. However, some hypotheses can be made:

(a) Concerning the slopes: it can be seen that the slope of the straight line for the alkyd paints is about eight times smaller than the slope obtained for the acrylic paints. This can be explained either by the fact that the adhesion strength site between pigment and binder for the acrylic is eight times greater than that for the alkyd paints, or, *ceteris paribus*, that the number of interacting sites in the case of the alkyd is eight times smaller than in the case of acrylic paints. The authors incline to the second hypothesis because:

- For the two paints investigated, the interactions are of the hydrogen bonding type and therefore have the same magnitude.
- Due to the chemical nature and configuration of the molecules that constitute alkyds, some of the potential interaction sites on pigments and binders are sterically hindered and hence inefficient.

It may also be observed that:

- σ_a is proportional to the number of acid sites present on the pigment surfaces in the case of acrylic paints; this is



normal since the acrylic resin used containing only ester groups is basic in character.

- σ_a is proportional to the sum of acid and basic sites present on the pigment surfaces; in the case of the alkyd paints this is normal owing to the fact that alkyds possess basic (ester groups, hydroxyl groups) and acid ($-\text{COOH}$) groups.

(b) a -values for the alkyd paints: at first sight the only hypothesis that may be advanced is that as the alkyd films are crosslinked, all the molecules are bound together. It follows that besides the interaction forces at the pigment/binder interface, frictional or shear forces at that interface should also be taken into account. The extrapolated value for a is $\approx 100 \text{ kg cm}^{-2}$. This value, for such forces, is reasonable if it is taken into consideration that the shear strength τ_s of the binder at the pigment surface can be twice or more than τ of the binder in the bulk.

The only case, but not discussed here, in which a continuously decreasing straight line for σ versus ψ is obtained, is for the system calcium carbonate/acrylic resin. This system follows Equation 4 which describes systems with no interfacial adhesion⁸, whatever ψ . This is easily explained if it is remembered that acrylics and carbonates are both basic in character and hence do not interact.

NB: Equation 3 is valid only for pigmentation up to the critical pigment volume concentration ψ_c . Just near or above ψ_c , voids, i.e. defects in the films, are present and the rupture process obeys other rules.

Conclusion

The ultimate strength of pigmented films (paints) is proportional to the pigment volume concentration ψ . The law followed is of the first order. The addition of pigments or fillers can affect the mechanical properties of the binder itself. The reinforcing coefficients depend mainly on the adhesion strength σ_a at the pigment/binder interface. σ_a is directly related to the nature and number of the interacting sites (acid/base) present on the pigment surface, and the acid-base character of the binder.

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Next month's issue

The Honorary Editor has accepted the following papers for publication. They are expected to appear in the September issue of the *Journal*:

Alternative technologies in coatings – The challenge and the response by *L. Valentine*

Pigmented UV dual cure coatings by *A. Noomen*

Developments in aqueous powder systems by *A. G. North*

Modern practices in formulating powder coatings by *S. T. Harris*

Oil and Colour Chemists' Association

ANNUAL REPORT OF THE COUNCIL FOR 1980

Adopted at the Nineteenth Annual General Meeting of the Incorporated Association, held on Friday, 19 June 1981 at the Beaufort Hotel, Bath, England at 4.22 p.m.

General

During the year under review several important events in the Association's activities took place and mention of this will be made in the various parts of the Report which deal with specific items.

The President (Dr F. M. Smith) and Mrs Smith visited the New Zealand Division and Dr. Smith presented a paper at their 17th Annual Convention at Rotorua 1-3 August and was able to discuss Association matters with members of the Division. The President also presented a paper at the Convention held by Oil & Colour Chemists' Association Australia (which is a member of the "International Committee to Co-ordinate Activities of Technical Groups in the Coatings Industry" formed in Paris in June 1979) at Tanunda, Barossa Valley, South Australia 17-20 July. In November the President and Mrs Smith were present at the South African Division's Eighth National Symposium held at Durban, 6-7 November. The President presented the Keynote Address and again was able to discuss Association matters with members of the Division. As a result of his overseas visits, the President formulated a paper on a suggestion to form an OCCA International and this was accepted in principle by Council. The details were being considered by a Past Presidents' Group at the end of the year.

Of particular importance to the Association's publication during the year was the presentation of the Audit Bureau of Circulations' Reed International Award to the *Journal* for the best submission for a Media Data Form from a society or association. Further reference is made later under the Publications Committee Report.

The Association's Biennial Dinner Dance took place at the Savoy Hotel, London WC2, on 11 April when the Association had the pleasure of entertaining a distinguished gathering of principal officers of other organisations. The Guest of Honour was Professor R. O. C. Norman, FRS (President of the Royal Institute of Chemistry), who replied to the Address of Welcome given by the President. A report of the function appeared in the June issue of the *Journal*.

The Annual Exhibition took place for the first time at the Cunard International Hotel, Hammersmith, London W6 from 13-15 May and attracted exhibitors from twelve countries and 124 organisations. Arranging the Thirty-Second Annual Exhibition in a hotel setting was a new departure for the Association, allowing a choice of different types of exhibition facility and this seemed to meet with the approval of both exhibitors, many of whom returned to the exhibition after an interval of several years,

as well as visitors. Unfortunately the middle day of the exhibition coincided with the TUC's "Day of Action", but this did not affect the attendance at the exhibition as severely as had been at first feared. A report appears later under the heading "Exhibition Committee" and a review appeared in the July issue of the *Journal*.

The President and Mrs Smith attended the FATIPEC Congress at Amsterdam on 8-13 June and Dr Smith attended the meeting of the newly formed International Committee to Co-ordinate Activities of Technical Groups in the Coatings Industry.

The Eighteenth Annual General Meeting of the Incorporated Association took place at the Piccadilly Hotel, London W1 on 26 June.

On this occasion the Council decided to combine the Annual Reunion with Past Presidents, Past Honorary Officers, Honorary Members and Past Members of Council with the Annual General Meeting.

In the morning a meeting took place of Past Presidents and the present Honorary Officers of the Association together with the Director and Secretary to review Association activities and a useful discussion took place.

At the luncheon the Council had the pleasure of entertaining several Past Honorary Officers and Honorary Members together with the Guest of Honour, Professor Sir Hermann Bondi, KCB, FRS, Chief Scientist of the Department of Energy and Chairman of the Advisory Council on Energy Conservation who presented a lecture entitled "Energy in the World" early in the afternoon.

The vote of thanks to the lecturer was proposed by Dr T. A. Banfield, Chairman of the London Section, which had arranged the lecture at the request of the Council.

The Annual General Meeting took place at the conclusion of the Lecture, when Mr D. J. Morris was appointed President Designate and the following Vice-Presidents were elected:

Mr C. Gooch
Mr S. R. Finn
Mr R. A. Eglington
Mr D. A. Bayliss
Mr P. Birrell
Mr J. E. Mitchell
Mr J. R. Taylor

The Honorary Officers were elected as follows:

Honorary Secretary Mr J. R. Bourne
 Honorary Treasurer Dr H. R. Hamburg
 Honorary Editor Mr D. S. Newton
 Honorary Research and
 Development Officer Mr C. N. Finlay

The report of the Auditors on the scrutiny of the postal votes was received and it was announced that the following members had been elected to the Council for the years 1980 – 1982:

Mr C. Butler
 Mr J. Smethurst
 Mr L. P. G. Goodale

Votes of thanks to the retiring Immediate Past President, Honorary Editor and Council Members, to the Honorary Officers and to the Director and Secretary were carried with acclamation.

At the Council Meeting in July it was reported that the Association's activities in the technical education field had become so important that it was felt necessary to appoint an Honorary Officer, whose specific task would be to look after this aspect. In accordance with the provisions of Article 65(E), Council appointed Mr A. T. S. Rudram (President 1975-1977 and a former Honorary Research and Development Officer) as Honorary Technical Education Officer. It was decided also that, in this capacity, he would be Chairman of the Technical Education Committee.

During the year Council conferred Commendation Awards upon Mr N. H. Seymour (a former Chairman of the Midlands Section and currently Honorary Treasurer of the Manchester Section) and Mr J. D. W. Davidson (a former Chairman of the Scottish Section) for their work in promoting the Association's activities, particularly at Section level.

It was agreed during the year that the newly-formed Nigerian Branch and the Zimbabwe Branch (which had previously been attached to the Transvaal Section) should both become Branches of the General Overseas Section. Insignias of office for the Chairmen of the two Branches were duly presented and both Branches reported encouraging activity during the year.

In the course of the year, Divisions and Sections of the Association have organised Symposia as follows:

The London Section held a Symposium on 26 March on "Resins" at the Thames Polytechnic, Woolwich, London SE18.

The London Section held a Joint Meeting with the Institute of Petroleum on 18 June on "The maintenance and protection against corrosion of North Sea structures" and the President of the Association proposed a vote of thanks to the lecturer.

The New Zealand Division held its 17th Annual Convention under the title "Into the Eighties" at Rotorua from 1-3 August.

The Newcastle Section held a Students' Symposium on 9 September on "Fundamentals of Paint Technology – Binders and Paint".

The Manchester Section held a Students' Symposium on 19 September on "Industrial Finishes" – "The Present and the Future".

The South African Division held their 8th National Symposium 6-7 November at Durban on "Coatings for the Eighties – Looking Ahead".

The London Section and the Building and Construction Group of the Plastics and Rubber Institute organised a joint Symposium on "Plastics and Paints against Corrosion" on 12 November at the Thames Polytechnic.

During the year, in addition to the Association ties, a ladies' scarf, bearing the Association's insignia in two corners, was introduced.

In the course of the year the Director & Secretary was pleased to welcome, amongst other visitors from overseas, the President of the Federation of Societies for Coatings Technology, Mr Elder Larson and the Executive Vice-President Mr F. Borrelle, Mr R. E. G. Johnson, the first Chairman of the Zimbabwe Branch of the General Overseas Section, Mr O. A. Shoaga, Honorary Treasurer of the Nigerian Branch of the General Overseas Section also visited the UK and discussed Association matters with the Director & Secretary. Mr P. Birrell (the first Chairman of the Ontario and currently a Vice-President) visited the UK and attended the Council Meeting on 22 October.

Council learnt with regret of the death of the following distinguished Members or former Members of the Association:

Mr S. G. Clifford (Honorary Treasurer of the Association 1924-1925; Honorary Secretary 1926-1929)

Mr A. R. Penfold (Honorary Member and Founder Chairman of the original Australian Section)

Mr R. F. G. Holness (a former Chairman of the London Section)

Mr A. H. McEwan (a former Chairman of the Wellington Section, who had been a recipient of a Commendation Award)

Mr M. Hess (who for many years had translated into German the summaries of Transactions and Communications appearing in the *Journal*)

Miss D. L. Tilleard, MBE (a former member of the Lightfastness Committee)

Mr G. O. H. J. Delorette (Honorary Treasurer of the Transvaal Section)

Mr G. Wiseman

Obituary notices appeared in the *Journal*.

Council was also saddened to learn of the sudden death of Sir John Methven who had presented the Commemorative Lecture on the occasion of the Association's Sixtieth Anniversary in May 1978.

In the Annual Report for 1979 it was stated that it had not been possible to appoint either an Assistant Secretary or an Administrative Assistant, both of which appointments were held when the Association had its offices at Wax Chandlers' Hall and this position continued throughout 1980. This has continued the increased burden

on the Director & Secretary and Council wishes to record their thanks for his continued efforts under such adverse circumstances. His assistance to the Members overseas is of particular importance.

Membership of the Association

Council reports that, in a year which has seen a general decrease in employment, the total membership has only slightly decreased during the year and the figures given below at 31 December 1980 relate only to those members whose 1980 subscriptions have been received; the names of those in arrears with subscriptions have been removed:

Section	Ordinary	Associate	Honorary	Student	Total
Bristol	63	13	—	—	76
Hull	44	2	—	—	46
Irish	33	8	—	—	41
London	485	42	5	7	539
Manchester	344	43	1	16	404
Midlands (including Trent Valley Branch)	163	18	—	7	188
Newcastle	105	8	—	7	120
Scottish (including Eastern Branch)	95	14	—	6	115
Thames Valley	94	17	—	1	112
West Riding	78	15	—	8	101
General Overseas	331	21	1	1	354
Zimbabwe Branch	24	7	—	—	31
Nigerian Branch	21	4	—	—	25
Ontario	71	14	—	—	85
New Zealand Division					
Auckland	122	48	—	1	171
Wellington	50	35	—	—	85
South African Division					
Cape	34	10	—	—	44
Natal	89	24	1	—	114
Transvaal	98	24	—	1	123
Total 1980—	2344	367	8	55	2774
Total 1979—	2407	369	9	87	2872
Net increase/decrease during 1980—	-63	-2	-1	-32	-98

The Council

During the calendar year the Council has met four times, the average attendance being 24. All meetings were held in London.

Committees of the Council

The Committees of Council met as set forth below:

Exhibition Committee	4
Finance Committee	2
Liaison Committee	—
President's Advisory Committee	4
Professional Grade Committee	4
Technical Committee	—
Jordan Award Committee	—
Technical Education Committee	—
Publications Committee	—
Forward Thinking Group	1

Exhibition Committee

Chairman: The Honorary Treasurer, Dr H. R. Hamburg

The Exhibition was held for the first time at a hotel venue, where facilities were available in an Exhibition Hall attached to the hotel for the display of heavy equipment, such as machinery. In addition to the New Hall of the Cunard International Hotel, London, the Association's Thirty-Second Annual Exhibition also covered the Queen Mary Suite and the Mezzanine floor which linked the New

Hall to the Queen Mary Suite. It was further possible to arrange for exhibitors to occupy rooms on the third floor of the hotel either as exhibitors or for use as hospitality suites in addition to their stands in the New Hall or Queen Mary Suite.

The second day of the Exhibition coincided with the TUC's Day of Action and thus the number of principal officers of other organisations able to attend a short reception was somewhat limited. On the following day exhibitors were also invited to attend a short reception when they met members of the Exhibition Committee and the Director & Secretary.

Admission to the Exhibition was free, but visitors were asked to complete Registration forms, since, as members of the Association of Exhibition Organisers, the Association has to complete the Exhibition Data Form, which is duly certified by the Association's auditors and the Audit Bureau of Circulations. Obtaining registration of all visitors proved to be much more difficult than at previous exhibitions, where turnstiles were in operation, and there was only one entrance to the Hall — since at the Cunard International Hotel the exhibition was arranged on four floors and there were many entrances which could be used. Nevertheless, the information obtained on the Registration cards showed that the exhibition had once again attracted visitors from a large number of overseas countries and the high quality of the exhibitors was manifestly evident.

Details of the analysis of the completed Registration cards was published in the July issue of the *Journal* together with a full report of the Exhibition, including a review of the stands; the Exhibition Committee recorded its thanks to Mr. D. S. Newton, Honorary Editor, who prepared the review.

Finance Committee

Chairman: The Honorary Treasurer, Dr H. R. Hamburg

In the last Annual Report it was stated that the Finance Committee considered that members would appreciate that in times of inflation it would be necessary for the membership subscription to be reviewed annually rather than biennially, and accordingly it was proposed and agreed at the Annual General Meeting that a small increase should be made on the subscription rates for 1981 for Ordinary and Associate Members, but that no increase should be made on the rates charged for Retired Members and Registered Students, which had remained the same for a number of years.

The Association's finances showed a considerable improvement during the year, mainly as a result of the increased support for the Exhibition but in common with many other publications in a time of recession, the support for advertising was not quite as good as might have been expected at the beginning of the year.

In May the Association's holding in 9½% Treasury Stock reached maturity and this was then held on Deposit Account where a high level of interest was naturally to the Association's benefit. At the end of the year the market value of the investments held showed that the equities stood at £3143 above their purchase price but that the market value of the British Government Securities was £1199 below their purchase price.

Jordan Award Committee

Chairman: The Honorary Research & Development Officer, Mr C. N. Finlay

The Jordan Award Committee did not meet during the year since this award is made biennially and the closing date for the application for the next award was 31 December 1980.

Liaison Committee

Chairman: The President

A meeting of the International Co-ordinating Committee took place during the FATIPEC Congress in Amsterdam 8-13 June 1980 which was attended by the President of the Association, Dr. F. M. Smith. The Association was pleased to present three papers at the FATIPEC Congress which formed a special session at which the President was invited to take the Chair. The Association also presented a paper at the FSCT Convention in Atlanta, Georgia, USA 29-31 October 1980.

The Director & Secretary was able to meet the President of the FSCT, Mr Elder Larson and the Vice-President, Mr F. Borelle to discuss matters of mutual interest in London.

The next meeting of the International Co-ordinating Committee will take place at the Association's Conference at Bath in June 1981.

President's Advisory Committee

Chairman: The President

For the 1980/1981 session, Dr F. M. Smith invited the Chairmen of the London Section, Dr T. A. Banfield, the Manchester Section, Mr A. C. Jolly, and the Newcastle Section, Mr J. Clark, all of whom were in their second year of office, to serve on the Committee, together with the Honorary Officers of the Association which included the Honorary Technical Education Officer after his appointment at the July Council Meeting.

Professional Grade Committee

Chairman: The President

The Professional Grade Committee were pleased to see a considerable amount of interest in the Professional Grade during 1980 and full details of the members admitted to the various grades appear in the December 1980 issue of the *Journal*. The table shows the position in the various categories at the end of the year.

The Committee considered in detail the regulations for admission to Fellowship, Associateship and Licentiate

and will be presenting their recommendations to Council early in 1981.

The Committee has been disappointed by the number of candidates for the Licentiate and asks that all senior members of the Association and those lecturing in Technical Institutes should encourage the younger members wherever possible to apply for admission to this grade.

Technical Committee

Chairman: The Honorary Research & Development Officer, Mr C. N. Finlay

During the year the Technical Committee has not met since its main function had been to consider the format and subject for 1981 Conference. This work had been completed by December 1979.

Technical Education Committee

Chairman: The Honorary Technical Education Officer, Mr A. T. S. Rudram (appointed in July 1980)

In the last Annual Report it was recorded that the membership of the Technical Education Committee had been enlarged at the Council Meeting in July 1979 in order to increase the representation from Technical Colleges and that a considerable amount of activity had taken place in connection with the integration of the Certificate and Diplomas of Technical Education Council courses into the Professional Grade scheme.

It became apparent during the first half of the year that the Association's activities in the field of Technical Education would be expanding in the future and it was agreed at the July Council Meeting to appoint a new Honorary Officer with specific responsibility for this function. In accordance with Article 65(E) Mr A. T. S. Rudram was duly appointed as Honorary Technical/Education Officer and also as Chairman of the Technical Education Committee. Since that time Mr Rudram has been collecting information from various sources and a meeting of this Committee to review progress will take place in early 1981.

Publications Committee

Chairman: The Hon. Editor, S. R. Finn, until June 1980, Mr D. S. Newton from July 1980

Thanks to the sterling work of Mr S. R. Finn, the transfer of the Honorary Editorship was a smooth process, and the Association is indebted to him for his hard work and dedication during his years of office.

There were no meetings of the Publications Committee this year, since there were no really important matters to

	<i>Applications received</i>	<i>Applications transferred between grades</i>	<i>Successful</i>	<i>Awaiting fulfilment of regulations</i>	<i>Not accepted</i>	<i>Resignations and deaths</i>	<i>Upgradings</i>	<i>As shown in December 1980 Journal*</i>
Fellowship	262	Less 48 Add 11	210	11	4	29	—	181
Associateship	354	Less 22 Add 60	340	32	20	41	16	283
Licentiate	50	Less 12 Add 11	20	18	11	—	10	10
	666	—	570	61	35	70	26	474

*Including the United Kingdom and Ireland, 33 countries are represented in the list of successful candidates published in the December 1980 issue of the *Journal*.

discuss, and in the present industrial climate it is felt that few Honorary Publication Officers have the time available to come to London for such occasions.

The first Monograph, on "Marine Finishes", by Dr T. A. Banfield was published during the year. It appeared in the *Journal* in two parts, and was also published separately. The subject was obviously of interest, since there has been a steady demand for copies during the rest of the year. Mr S. R. Finn kindly agreed to continue to look after arrangements for the publication of future monographs.

The year's Volume consisted of 522 pages of text, compared with 516 in the previous year, each issue having on average four technical papers. The geographical and subject analyses are given below and, of the 48 papers published, 18 were of UK origin, and only 5 originated from Sections.

The number of overseas contributions was very gratifying, and indicated that the reputation of the *Journal* in these areas was of a high order, but it also reflected the lack of new information arising from a lowered level of research work in the United Kingdom.

In December 1979, the Reader Enquiry form was first introduced into the *Journal* and this has been very widely used throughout 1980 and has proved of considerable benefit to readers of the *Journal*. In November the *Journal* was awarded the Audit Bureau of Circulations "Reed International Award" for the best submission of a media data form from a Society or Association *Journal* and this

Papers in Geographical Origin

UK Direct Contribution	12
UK Section Lectures	5
Argentina	2
Australia	1
Canada	3
Denmark	1
Egypt	3
India	13
Italy	1
Iran	2
Netherlands	2
New Zealand	1
Nigeria	1
USA	1
	—
	48
	—

Papers by Subject

Oils & Varnishes	3
Resins	10
Solvents	4
Pigments	1
Paints (Performance)	13
Paints (Physical Properties)	4
Dispersion	2
Analysis	2
Application	1
Powder Coatings	1
Toxicity	1
Miscellaneous	5
Instrumentation	1
	—
	48
	—

prestigious Award was presented to the Director & Secretary following the Annual General Meeting of the Audit Bureau of Circulations on 12 November.

It was mentioned in the last Annual Report that a Readership survey form had been enclosed with the November 1979 issue of the *Journal*. The results of this survey, which was duly certified by the Association's auditors and accepted by the ABC, showed that the estimated average readership of the *Journal* was in excess of 22,000 per issue.

A non-Conference year can affect the flow of papers for the *Journal* but 1980 posed no problems in this respect, since sufficient papers were on hand at the end of the year to cover the period up to the 1981 Bath Conference.

The Honorary Editor wishes to thank the Honorary Section Publications Officers for their efforts in providing information at Section level, and the Director and Staff at Priory House, particularly Mr D. N. Buddles, the Assistant Editor, who took over at a difficult period.

Representation on other organisations

The Association was represented on other organisations as follows:

Technical Training Board for the Printing Ink and Roller Making Industry: Mr H. C. Wordsall and Mr G. A. Tabbernor (until September when Board was disbanded).

The Parliamentary and Scientific Committee: The President and the Director & Secretary.

The British National Committee for Chemistry: Dr G. D. Parfitt from December 1979 to July 1980 - Dr F. M. Smith from October 1980.

City and Guilds Advisory Committee for the Chemical Technicians Certificate: Dr J. G. Gillan.

East Ham Technical College Consultative Committee for the Science Department: Mr R. M. W. W. Wilson.

Association of Exhibition Organisers: The Director & Secretary.

Programme Liaison Committee: The Honorary Programme Officer of the London Section and the Director & Secretary.

Training Committee of the Paintmakers' Association: The Director & Secretary with Mr A. T. S. Rudram until October, Honorary Secretary from October.

The Paintmakers' Association Hazardous Substances Advisory Panel and Technical Committee: Mr A. J. Ford.

The Society of Dyers & Colourists "Review of Coloration Progress" Committee: Mr J. T. Tooke-Kirby.

The Colour Group (Great Britain): Mr K. Lord.

Institution of Corrosion Science and Technology Education Committee: Mr D. S. Newton.

Institute of Metal Finishing Technical Education Committee: Mr A. R. H. Tawn.

British Standard Institution:

- PVC Pigments, Paints & Varnishes Industry Committee: *Mr R. G. J. Toms*
- PVC/1 Pigments: *Mr E. A. Peters, Mr S. A. Ray*
- PVC/1/6 White Pigments: *Mr S. A. Ray*
- PVC/1/8 Chrome Pigments, Prussian Blue and Zinc Phosphate: *Mr D. S. Newton*
- PVC/1/18 Zinc Dust Pigments: *Mr D. S. Newton*
- PVC/3 Paints Media and Related products: *Mr G. H. Hutchinson*
- PVC/4 Lac: *Dr B. S. Gidvani*
- PVC/6 Cement Paints: *Mr W. O. Nutt (now amalgamated)*
- PVC/8 Plastic Wood: *Mr V. P. Gellay (disbanded)*
- PVC/10 Test Methods for Paints: *Mr A. N. McKelvie*
- PVC/11 Glossary of Paint Terms: *Mr S. A. Ray to October, then Mr G. V. G. Hill*
- PVC/1/12 Organic Pigments: *Mr J. McAllister*
- PVC/14 Colour Schedules: *Mr A. B. Lock to October, then Mrs E. Stretton*
- PVC/15 Water Paints and Distempers: *Mr T. W. Wilkinson (disbanded)*
- PVC/16 Priming Paints for Wood: *Mr W. Phillips*
- PVC/19 Bituminous Paints: *Mr R. Lang (now amalgamated)*
- PVC/20 Calcium Plumbate Priming Paints: *Mr M. Pettit (now amalgamated)*
- PVC/21 Surface Preparation of Steel: *Mr A. N. McKelvie*
- PVC/23 Zinc Rich Paints: *Dr D. Atherton (now amalgamated)*
- PVC/24 Water Thinned Wood Priming Paints: *Mr W. Phillips (now amalgamated)*
- PVC/25 Organic Finishes for Aluminium Windows: *Mr D. E. Hopper (now amalgamated)*
- PVC/27 Paint Systems for Metallic Substrates: *Mr R. Lang, Mr M. Pettit, Mr P. W. Munn*
- PVC/28 Paint Systems for Non-Metallic Substrates: *Mr W. O. Nutt, Mr W. Phillips*
- LGL/9 Artificial Daylight for Colour Matching: *Mr K. Lord*
- C/17 Viscosity: *Mr A. N. McKelvie*
- C/17/2 Revision of BS188 (Drafting): *Mr A. N. McKelvie*
- CPE/10/1 Test Sieves: *Mr D. S. Newton*
- CPE/10/2 Test Sieving and other sizing methods: *Mr D. S. Newton*
- CIC/4 Solvents and Allied Products: *Mr A. R. H. Tawn*
- CIC/6 Glycerol: *Mr W. A. Ledger*
- OFC/7 Sampling Oilseeds, Oils and Fats: *Mr M. Beresford (disbanded)*
- OFC/12 Vegetable Oils: *Mr M. Beresford (disbanded)*
- OFC/24 Analysis of Oilseeds, Oils and Fats: *Mr M. Beresford (disbanded)*
- GEL/16/3 Varnishes: *Mr N. H. Seymour*
- ACE/44 Aircraft Finishes: *Mr J. B. G. Lewin to October 1980, then Mr R. G. Booth*
- BDB/7 Building Protection and Maintenance: *Mr J. E. Mitchell*
- RDB/25 Road Marking Compounds: *Mr T. R. Bullett*
- DOS/3/10 Chemistry and Chemical Technology (UDD54 & 66): *Mr J. Orpwood*

The Association was also represented on overseas organisations as follows:

New Zealand

Surface Coatings Committee of the Standards Association of New Zealand: *Mr T. Slinn.*

South Africa

Natal College for Advanced Technical Education, Science and Education Advisory Committee: *Mr J. R. S. Reid with Mr K. M. Engelbert as alternate.*

Council of the Natal Section Association of Scientific and Technical Societies: *Dr D. E. A. Williams-Wynn.*

SABS Specification – Paints and Test Methods: *K. M. Engelbert.*

SAPMA Witwatersrand Technical Education Committee for Paint Science: *Mr P. A. J. Gate.*

Appendix

Report of the Council in accordance with the Companies Act 1967

- The Council presents herewith the audited accounts of the Association for the year ended 31 December 1980.
- Results*
The results for the year and the appropriation thereof are set out in the Income and Expenditure Account on page 8.
- Principal activities of the Association*
The Association has continued in its work of furthering the development of the science and technology of the oil and colour industries.
- Change in fixed assets*
The movement in fixed assets during the year is set out in the Table on page 11.
- The Council*
The following were members of Council at 31 December 1980:
F. M. Smith, BSc, PhD, CChem, FRSC, CCol, FSDC, MIOP, FTSC
C. Gooch, FTSC
S. R. Finn, BSc, FRSC, FTSC
R. C. Somerville
D. J. Morris
H. R. Hamburg, PhD, FTSC
C. N. Finlay, ATSC
C. Barker
A. T. S. Rudram, FTSC
B. F. Gilliam, ATSC
J. R. Taylor, BSc, FRSC, FTSC
W. G. Paul
L. H. Silver
T. Entwistle, FTSC
P. W. Munn, BSc, CChem, MRSC, AMBIM
T. A. Banfield, PhD, DIC, ARCS, FICorT, FTSC
A. J. Newbould, BSc, MRSC
A. C. Jolly, BSc, FTSC
F. Redman, ATSC
J. A. Burns
R. L. Devenish
D. E. A. Williams-Wynn, MSc, PhD, CChem, FRSC
J. Clark, BSc
S. Patel, BSc, ATSC
H. C. Worsdall, FTSC
T. L. M. Humphrey, ATSC
G. V. G. Hill, BSc, AMICorT, LRPS, FTSC
V. A. Moore, AIMF
G. L. Willis, BAgSc
G. Willison, MRSC
M. G. Bentley, ATSC
R. A. C. Chappel, MRSC
J. E. Mitchell, BSc, FRSC, FTSC (elected 26 June 1980)
C. Butler, LRSC, FTSC (elected 26 June 1980)
J. Smethurst, AMCT, FTSC (elected 26 June 1980)
L. P. G. Goodale (elected 26 June 1980)
R. A. Eglington, BSc, FTSC (elected 26 June 1980)
D. A. Bayliss, FTSC (elected 26 June 1980)
P. Birrell, FTSC (elected 26 June 1980)
D. S. Newton, AMCT, FICorT, FIMF, FTSC (elected 26 June 1980)
J. R. Bourne, FTSC (elected 26 June 1980)
G. W. Fowkes (elected 25 April 1980)
L. J. Brooke, ATSC (elected 25 April 1980)
J. L. Taylor (elected 18 April 1980)
R. N. Rea (elected 18 April 1980)
D. F. Smith (elected 27 March 1980)
R. E. Rouse, BSc, FTSC (elected 16 April 1980)
E. A. Watson, BSc, MICorT (elected 10 April 1980)
J. Toovey, BSc, FTSC (elected 10 April 1980)

In addition the following were members of Council at 1 January 1980 and served during the year; the date shown after

each name denotes when during 1980 service on Council terminated:

A. McLean, BSc, ARCST, CChem, FRSC, FTSC (26 June 1980)
 P. A. J. Gate, BSc, FTSC (26 June 1980)
 J. L. Inshaw, MRSC, ACTC, FTSC (26 June 1980)
 T. W. Wilkinson, ATCT, FTSC (26 June 1980)
 H. K. R. Nielsen, BSc, FTSC (26 June 1980)
 C. H. Morris (26 June 1980)
 J. D. W. Davidson, FIPE, FIWM, FICorrT, FTSC (26 June 1980)
 D. N. Fidler, MSc (25 April 1980)
 Mrs E. N. Harper (25 April 1980)
 R. Brooks (31 March 1980)
 K. Callaghan (18 April 1980)

F. Hellens, CChem, MRSC, MCIC (10 April 1980)
 I. R. McCallum, LRSC, ATSC (10 April 1980)
 A. G. Shepherd (16 April 1980)
 A. R. Burns, ATSC (27 March 1980)

6. *Auditors*

In accordance with Section 14(1) of the Companies Act 1976, a resolution will be proposed at the general meeting to reappoint the auditors, Coopers & Lybrand.

By Order of the Council

ROBERT HAMBLIN
 Director & Secretary

2 January 1981

OIL AND COLOUR CHEMISTS' ASSOCIATION

BALANCE SHEET as at 31 December 1980

1979		1980		1979		1980	
£	£	£	£	£	£	£	£
		ACCUMULATED FUNDS—				FIXED ASSETS—(Note 1)	
	107,587	Balance at 1 January	109,866		12,115	Furniture, Fittings, Office Machines and Motor Car at cost	13,160
109,866	<u>2,279</u>	Add Surplus for the year . . .	<u>25,956</u>			Less Accumulated Depre- ciation	<u>(11,518)</u>
			135,822		983		1,642
	84,412	CURRENT LIABILITIES—				Freehold Property at cost .	73,631
		Receipts in advance	59,578		73,631	Less Accumulated Depre- ciation	<u>(2,900)</u>
	25,150	Creditors and Accrued Liabilities	<u>20,195</u>		<u>(2,100)</u>		
109,562			79,773		71,531		70,731
					<u>72,514</u>		<u>72,373</u>
						LISTED INVESTMENTS—	
					12,110	British Government Securi- ties at cost	7,209
						(Market value £6,010) (Market value 1979 £10,675)	
					11,406	Other Investments at cost	11,406
						(Market value £14,549) (Market value 1979 £11,918)	
					23,516		18,615
						CURRENT ASSETS—	
					1,038	Stock of unsold publica- tions at cost (Note 7)	—
					2,418	Paper stock in hand at cost (Note 7)	2,954
					8,408	Debtors and Payments in Advance	9,132
						Balance at Bankers and Cash in Hand in United Kingdom and Overseas Sections (Note 8)	112,521
					111,534		124,607
					<u>123,398</u>		
<u>£219,428</u>			<u>£215,595</u>		<u>£219,428</u>		<u>£215,595</u>

F. M. SMITH
*President*H. R. HAMBURG
*Hon. Treasurer*R. H. HAMBLIN
Director and Secretary

REPORT OF THE AUDITORS TO THE MEMBERS

1. We have audited the accounts on pages 8 to 12 in accordance with approved Auditing Standards. The accounts have been prepared under the historical cost convention.
2. The accounts incorporate the unaudited accounts of United Kingdom and overseas sections for the year ended 31 December 1980. We have not verified any of the accounts prepared by these sections which, at 31 December 1980, reported net assets £22,475 (1979 £19,861) the only figures of any significance being cash which amounted to £27,201 (1979 £25,622) and creditors which amounted to £6,558 (1979 £5,761).
3. Subject to this reservation, in our opinion, the accounts give a true and fair view of the state of the Association's affairs at 31 December 1980 and of its results and source and application of funds for the year then ended and comply with the Companies Acts 1948 to 1980.

London, 8th April 1981

COOPERS & LYBRAND
Chartered AccountantsNB: The page reference given in the paragraph above and on subsequent pages are equivalent to pages 314 and 318 respectively in this *Journal*.

OIL AND COLOUR CHEMISTS' ASSOCIATION

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER 1980

£	1979 £	£		£	1980 £	£
			INCOME			
			MEMBERSHIP AND GENERAL INCOME—			
	37,230		Subscriptions	40,107		
	82		Professional Grade Certification fees	270		
	843		Entrance Fees	765		
	2,368		Publications	1,602		
	158		Sundry income	676		
	9,636		Profit on sale of investment and fixed assets (1980 surplus on redemption)	274		
	2,171		Section Surplus (Note 5)	2,158		
	3,206		Conference 1980	—		
	7,584		Investment Income	15,331		
	63,278				61,183	
			JOURNAL RECEIPTS—			
	24,862		Advertising	21,749		
	37,806		Sales	41,997		
	2,295		OCCA Australia	2,754		
	2,472		Reprints	1,513		
	67,435				68,013	
	39,540				127,922	
170,253			EXHIBITION RECEIPTS			257,118
			EXPENDITURE			
			MEMBERSHIP AND GENERAL EXPENSES—			
	16,979		Administration expenses (Note 4)	21,381		
	23,240		Journal	24,289		
	13,052		Postage, printing and stationery	15,904		
	—		Notices	164		
	6,308		General expenses, including accountancy	6,604		
	59,579				68,342	
			JOURNAL EXPENSES—			
	16,980		Administration expenses (Note 4)	21,380		
	28,405		Printing and publication	29,686		
	1,404		Reprints	1,639		
	5,136		Postage and stationery	6,214		
	2,314		General expenses	2,403		
	54,239				61,322	
			EXHIBITION EXPENSES—			
	34,862		Direct expenses	77,715		
	16,980		Administration expenses (Note 4)	21,380		
	2,314		General expenses	2,403		
	54,156				101,498	
167,974						231,162
2,279			Surplus for the year			25,956
£2,279			Surplus for the year carried forward			£25,956
			STATEMENT OF RETAINED RESERVES			
	1979			1980		
	£			£		
	2,279		Surplus for the year	25,956		
	107,587		Balance at 1 January	109,866		
	£109,866			£135,822		

OIL AND COLOUR CHEMISTS' ASSOCIATION

NOTES ON THE ACCOUNTS as at 31 December 1980

1. Fixed Assets

Cost	Furniture, Fittings, Office Machines and Motor Car		Freehold Property	
	£	£	£	£
At 1 January 1980	12,115		73,631	
Additions	1,045			
Disposals				
		13,160		73,631
Depreciation				
At 1 January 1980	11,132		2,100	
Disposals				
Charged to Income and Expenditure Account in 1980	386		800	
		(11,518)		(2,900)
Net Book Value at 31 December 1980		<u>£1,642</u>		<u>£70,731</u>

Depreciation of fixed assets is calculated so as to write off the assets over their expected useful lives. The principal rates used for this purpose, which are consistent with those of the previous years are: Freehold Buildings 2%; Furniture, Fittings and Office Machines 10% or 25%.

2. Foreign Currencies

Overseas Section income, expenditure, assets and liabilities have been converted to Sterling at the following rates ruling at 31 December 1980:

	1979	1980
New Zealand	\$2,270	\$2,4850
South Africa	R1,8455	R1,781
Canada	\$2,620	\$2,8545
Zimbabwe - Rhodesia	Z\$1,4950	Z\$1,4975

3. The Ethel Behrens Fund and the Jordan Award Fund

The Ethel Behrens Fund and the Jordan Award Fund have not been incorporated in the Association's Income & Expenditure Account and Balance Sheet, but have been shown as separate accounts.

4. Administration Expenses

Administration expenses have been equally apportioned between the three main headings of expenditure in the Income & Expenditure Account. The appropriation has been calculated on the basis of estimated staff-time involved. These expenses are:

1979		1980
£		£
39,109	Salaries including pensions	48,688
5,173	Agency Staff	7,697
499	Welfare	590
4,196	Rates, lighting and telephone	4,975
800	Audit Fee	960
1,162	Depreciation of fixed assets	1,186
-	Credit Notes issued	45
<u>£50,939</u>		<u>£64,141</u>

The charge to each heading is therefore:

16,979	Membership	21,381
16,980	Journal	21,380
16,980	Exhibition	21,380
<u>£50,939</u>		<u>£64,141</u>

5. Section Surplus (1979 and 1980)

1979		1980
£		£
194	Bristol	34
(135)	Hull	53
(467)	(a) Irish	48
(375)	(a) London	(710)
1384	Manchester	6
(186)	(a) Midlands	(220)
72	(a) Trent Valley Branch	(165)
(93)	Newcastle	296
(464)	(a) Scottish	117
(296)	Thames Valley	(293)
(32)	West Riding	488
(613)	(a) Auckland	352
(67)	(a) Wellington	(257)
137	(a) Natal	3,121
1931	(a) Cape	(141)
1261	(a) Transvaal	(823)
(77)	(a) Ontario	(189)
(3)	(b) Zimbabwe - Rhodesian Branch	441
<u>£2,171</u>		<u>£2,158</u>

NOTES:

- (1) (a) unaudited returns incorporated in the accounts 13.2.81
- (2) (b) estimated returns included in the accounts 13.2.81
- (3) Net surpluses are shown without brackets.
Net deficits are shown inside brackets.
- (4) The figures reflect the net increase/(decrease) in assets, including cash, held by the Sections during the year.

6. Limited by Guarantee

The liability of the members of the Association is limited by guarantee.

7. Stocks

The value is determined on the basis of the lower of cost and net realisable value. Cost is determined on a first-in, first-out basis.

8. Cash at bank comprises

1979		1980
£		£
76,906	Amounts on deposit	98,522
573	Savings Certificates	525
34,055	Current Accounts and Cash in Hand	13,474
<u>£111,534</u>		<u>£112,521</u>

Auditors' Report - Page 9

OIL AND COLOUR CHEMISTS' ASSOCIATION**ETHEL BEHRENS FUND**

INCOME & EXPENDITURE ACCOUNT for the year ended 31 December 1980

1979		1980	1979		1980
£	Expenditure	£	£	Income	£
103	Income Tax on Investment Interest	49	245	Interest on Investments (Gross)	123
-	President's Expenses	537	17	Distribution from estate	-
159	Surplus (1979)	-	-	Surplus on redemption of investment	140
				Deficit 1980	323
<u>£262</u>		<u>£586</u>	<u>£262</u>		<u>£586</u>

BALANCE SHEET as at 31 December 1980

1979		1980	1979		1980
£	Liabilities	£	£	Assets	£
2,761	Accumulated Fund Balance at 1 January 1980	2,920	2,446	British Government Securities at cost	2,582
159	Surplus (1979)	-		(Market Value £2,480)	
-	Less Deficit (1980)	323		(1979 £2,526)	
			474	Balance at Bank	15
<u>£2,920</u>		<u>£2,597</u>	<u>£2,920</u>		<u>£2,597</u>

NOTE: The Government Securities held (94% Treasury 1980) reached maturity in May and were redeemed; a further investment was not made until September.

JORDAN AWARD FUND

INCOME & EXPENDITURE ACCOUNT for the year ended 31 December 1980

1979		1980	1979		1980
£	Expenditure	£	£	Income	£
111	Award	-	138	Interest on Investments (Gross)	138
27	Surplus	138			
<u>£138</u>		<u>£138</u>	<u>£138</u>		<u>£138</u>

BALANCE SHEET as at 31 December 1980

1979		1980	1979		1980
£	Liabilities	£	£	Assets	£
1,397	Accumulated Fund Balance at 1 January 1980	1,424	1,007	British Government Securities at cost	1,007
27	Surplus	138		(Market Value £1,130)	
			417	(1979 £1,045)	
				Balance at Bank	555
<u>£1,424</u>		<u>£1,562</u>	<u>£1,424</u>		<u>£1,562</u>

OIL AND COLOUR CHEMISTS' ASSOCIATION

STATEMENT OF SOURCE AND APPLICATION OF FUNDS FOR THE YEAR ENDED 31 DECEMBER 1980

	Year ended 31.12.80 £	Year ended 31.12.79 £
SOURCE OF FUNDS		
Unappropriated surplus/(deficit) for year	25,956	2,279
<i>Deduct</i> profit on sale of investments and fixed assets	(274)	(9,636)
Adjustment for item not involving the movement of funds:		
Depreciation and amortisation	1,186	1,162
TOTAL GENERATED FROM OPERATIONS	<u>£26,868</u>	<u>£(6,195)</u>
FUNDS FROM OTHER SOURCES		
Proceeds from the sale of investments (1980 redemption only)	5,176	17,449
	<u>£32,044</u>	<u>£11,254</u>
APPLICATION OF FUNDS		
Purchase of fixed assets	1,044	—
INCREASE/(DECREASE) IN WORKING CAPITAL	<u>£31,000</u>	<u>£11,254</u>
INCREASE/(DECREASE) IN WORKING CAPITAL comprises—		
Increase/(Decrease) in stocks	(502)	973
Increase/(Decrease) in debtors and payments in advance	724	1,619
Increase/(Decrease) in current liabilities	29,790	(44,272)
Movement in net liquid funds:		
Increase/(Decrease) in balance at bankers and cash	988	52,934
	<u>£31,000</u>	<u>£11,254</u>

Auditors' Report – Page 9

Proceedings of the Annual General Meeting

The nineteenth Annual General Meeting of the Incorporated Association was held on 19 June 1981 at 4.22 p.m. at the Beaufort Hotel, Bath with the President (Dr F. M. Smith) in the chair.

There were 26 members present. The notice convening the meeting was read.

Apologies

Apologies for absence were received from Mr L. J. Brooke, Mr G. A. Cox, Mr T. Entwistle, Mr L. P. G. Goodale, Mr A. McLean, Mr D. J. Silsby, Mr D. H. Vettewinkel and Mr S. R. Finn.

Minutes

The President asked the meeting to take as read the minutes of the eighteenth Annual General Meeting held on 26 June 1980, as printed and circulated in *JOCCA*, pp. 352-354 inclusive, August 1980.

There being no comments, the adoption of the minutes was put to the meeting and carried unanimously.

Report of the auditors to the members

The report of the auditors to the members was read.

Annual Report of the Council for 1980

Mr J. R. Bourne (Honorary Secretary) moved the adoption of the Annual Report of the Council and statement of accounts for 1980 and he drew attention to the President's

overseas visits, to the move towards OCCA International, to the achievement by the Association's Journal in winning the Reed International Award for 1980, to the first Exhibition at the Cunard International Hotel, to the two new Branches of the General Overseas Section founded in Zimbabwe and Nigeria and was pleased to record that there now seemed to be a halt in the small decline in the total membership. Dr H. R. Hamburg seconded the adoption.

The President asked for comments; Dr L. Valentine commented on the amount received from sales of the *Journal* to members of OCCA Australia.

In relation to the very successful 1980 Exhibition, Dr K. Borer, Mr I. McCallum, Dr H. R. Hamburg, Mr C. N. Finlay, Mr D. J. Morris and the Director & Secretary commented briefly on the Exhibition held in April 1981. The President stated that the views expressed would be noted and would be conveyed to the Exhibition Committee.

There being no further comments on the Annual Report of the Council and statement of accounts, these were formally adopted by the meeting.

Election of President (1981-83)

Dr F. M. Smith stated that, as indicated on the agenda, Mr D. J. Morris had been nominated by the Council as President of the Association and he now asked the Annual General Meeting to accept the nomination.

This was carried unanimously with acclamation.

Mr D. J. Morris thanked the meeting for their confidence and stated that he was looking forward to his period of office. He then asked Dr F. M. Smith to preside for the remainder of the Annual General Meeting and at the Conference Dinner later in the day.

Election of Vice-Presidents of the Association

The President read the nominations of the Council as printed on the Agenda and asked the meeting to accept them *en bloc*. This was agreed. He pointed out that two Vice-Presidents were retiring, Mr C. Gooch and Mr S. R. Finn and he asked the meeting to note that there were Vice-Presidents from South African and New Zealand Divisions as well as the Ontario Section. The following were then elected as Vice-Presidents:

- (i) Mr R. A. Eglington
- (ii) Mr B. Bettison
- (iii) Mr D. A. Bayliss
- (iv) Mr P. Birrell
- (v) Mr J. E. Mitchell
- (vi) Mr J. R. Taylor
- (vii) Mr C. N. Finlay

Election of Honorary Officers of the Association

The President stated that Mr C. N. Finlay would be retiring after six years distinguished service as Honorary Research & Development Officer, during which he had arranged the technical sessions for three conferences. As had been previously noted, Council had nominated Mr C. N. Finlay as a Vice-President in recognition of his work on behalf of the Association. During the year Council had appointed an Honorary Technical Education Officer under article 65(e), the office which had been filled by Mr A. T. S. Rudram. On being put to the meeting it was unanimously agreed to elect the honorary officers as follows:

Honorary Secretary	Mr J. R. Bourne
Honorary Treasurer	Dr H. R. Hamburg
Honorary Editor	Mr D. S. Newton
Honorary Research and Development Officer	Mr J. R. Taylor
Honorary Technical Education Officer	Mr A. T. S. Rudram

Announcement of election of three Elective Members to Council 1981-83

The President stated that under article 43(ii) where the number of persons nominated was no greater than the number of vacancies, the persons so nominated shall be declared elected. At the closing date for nominations (24 April), three nominations had been received for the three elective places and the following members were therefore declared duly elected to serve as Elective Council Members for the period 1981-1983:

Mr F. D. H. Sharp
Mr F. B. Windsor
Mr H. C. Worsdall

Chairmen of Sections for the coming session

The names of the Section Chairmen for the coming year were given as follows:

Auckland	Mr R. White
Bristol	Mr G. W. Fowkes
Cape	Mr D. F. Smith
Hull	Mr P. W. Munn
Irish	Mr R. N. Rea
London	Mr B. F. Gilliam
Manchester	Mr F. B. Redman
Midlands	Mr R. L. Devenish
Natal	Mr K. E. Piggott
Newcastle	Mr E. A. Watson
Ontario	Mr D. Laming
Scottish	Mr T. L. M. Humphrey
Thames Valley	Mr V. A. Moore
Transvaal	Mr R. E. Rouse
Wellington	Mr A. Stubbs
West Riding	Mr R. A. C. Chappell

Membership subscription rates

The President asked the meeting if they would agree to accept the items on membership subscriptions covered by agenda items 11, 12 and 13 *en bloc*, and this was agreed. He explained that the Sections overseas had felt that their subscriptions should not be as high as that paid by members in the UK, since they considered that members in the UK received benefits which were not available to those overseas. During the year the Council had agreed to discontinue sending individual circulars for Section meetings in the UK and Ireland from headquarters, and the position now reached was such that it was felt that negotiations could take place with the Sections overseas regarding the amount which they would transfer to the UK, to cover the *Journal* and a share of administrative expenses, since it was clear that the subscriptions being charged overseas were now too low to enable them both to organise functions and to send adequate remittances to headquarters. The President pointed out that under article 11, resolutions had to be passed at two successive Council meetings and confirmed at the Annual General Meeting and this procedure had been followed in all cases.

He proposed from the chair and it was agreed unanimously without comment that, with effect from 1 January 1982, the annual membership subscription rates in the various categories of membership shall be as follows:

Ordinary or Associate Member	£22.00 per annum
Retired Members	£3.00 per annum

There will be no increase in the rates for Registered Students, and that the 1981 subscriptions for Ordinary and Associate Members attached to the New Zealand Division, South African Division and the Ontario Section would be New Zealand \$33, South African R30 and Canadian \$30 respectively.

By resolution of the Council, Value Added Tax will be applicable to membership subscriptions paid by members resident in the United Kingdom.

Reappointment of auditors and fixing the remuneration thereof

It was proposed by Mr K. Arbuckle that Coopers & Lybrand (chartered accountants) be reappointed auditors

of the Association and that their fee for 1981 be £900. This was seconded by Mr S. T. Harris and carried unanimously.

Vote of thanks to retiring Council Members

The President called upon Dr L. Valentine to propose a vote of thanks to those members retiring from Council and not serving in another capacity in the forthcoming session. Dr Valentine felt that members would appreciate the very considerable service which had been given to the Association by those who had served as Vice-Presidents, Elective Members, Section Chairmen and Section Representatives and he proposed a vote of thanks to those members, which was carried with acclamation.

Vote of thanks to Honorary Officers of the Association

Dr G. de Winter Anderson proposed a vote of thanks to the Honorary Officers of the Association, drawing particular attention to the work of Mr C. N. Finlay who was retiring as Honorary Research & Development Officer. He asked the Annual General Meeting to show their appreciation to the Honorary Officers of the Association and this was carried with acclamation.

Further information on any of the publications reviewed may be obtained by circling the appropriate *Reader Enquiry Service* number on the form at the back of the *Journal*. Enquiries will be forwarded to the publisher.

Published Data on European Industrial Markets

Industrial Aids Limited, London, UK

March 1981

pp. 270 paperback

Price £29.00 (UK) inc. p&p. £32.00 in all other countries

A reference book listing market studies for 1981 which are available for purchase, as well as providing a guide to other sources of published data (including national statistics) in both East and West Europe.

For information on membership of OCCA, enquiries should be sent to the Association's offices, see front cover for address.

Manchester

Medials

The final senior lecture of the present programme was delivered by Mr W. K. A. Lakin of Manchem Ltd, on Monday 9 March 1981. The venue was the Bolton Crest Motel and 42 section members and their guests were in attendance.

The lecturer, Ken Lakin, is a Manchester Section member, a previous organiser of a section symposium and

Vote of thanks to retiring President

In proposing a vote of thanks to the retiring President, Mr G. W. Fowkes, Chairman of the Bristol Section, paid tribute to the way in which the President and Mrs Smith had travelled to Sections both at home and overseas on behalf of the Association and had also maintained contact with other organisations overseas.

He asked the meeting to show their appreciation and the vote of thanks was carried with acclamation.

Dr Smith thanked Mr Fowkes for the way in which he had proposed the vote of thanks and the members for its kind reception.

Dr Smith felt that the Annual General Meeting would also wish to record a vote of thanks to the Director & Secretary (Mr R. H. Hamblin) and his staff for their work on behalf of the Association. This was carried with acclamation.

Any other competent business

There being no other competent business, the President declared the meeting closed at 4.55 p.m.

reviews

The surface coatings industry is represented with 27 reports, and the ink and graphics industries with 42.

A book of this type can only be as comprehensive as the various market research organisations allow, and it has been noted that one or two well-known names are missing. Nevertheless, a most useful book for those active in the industrial marketing field even at this price. Since time can be equated to money, the availability of information of this sort can certainly save both.

Reader Enquiry Service No. 21

D. S. Newton

occa meetings

this was his second lecture of the present session to the Manchester Section. An initial summary of the lecture is as follows: Increasing costs of raw materials and labour, together with environmental regulations mean that the paint industry is being pressured to produce paints with much lower solvent content than before. Traditionally for-

occa meetings

mulated alkyds meeting these new requirements suffer from slow drying and poor through drying.

The lecturer reviewed the latest results from the use of complex aluminium components, which have been shown to greatly improve this poor drying. The use of 100 per cent "solid" components to increase the total solids content of the system was discussed.

Further summarised details of the lecture, which contained many slides, appear below:

California, along with Scandinavia, is constantly involved with environmental legislation, new regulations (rule 1113) seek to control the volatile organic components (VOC) of architectural coatings to less than 250 grams/litre. It was predicted that the regulations would be adopted throughout the USA and its presence should influence legislation in the UK.

Typical air drying alkyds of the present era contain more than 350 grams/litre of volatile material. The complexities of decreasing the VOC to 250 and the effects on

application properties, other changes affecting molecular weight, critical molecular weight and increased cross linking requirements were fully discussed.

Ken Lakin stated that conventional drier systems were not suitable for achieving the necessary cross linking in relation to drying time, hence the work of Manchem in relation to aluminium compounds in surface coatings, and the specific development of aluminium as a co-ordinate cross-linker together with an oxidative catalyst such as cobalt or manganese.

The practical work involved the use of four commercially available alkyds, their selective modification with alkali refined linseed oil and a comparison of drier systems: cobalt, zirconium, and calcium versus a cobalt drier and an aluminium complex.

White paints were made, based on the various media produced. They were applied and their respective drying properties carefully monitored using a BK recorder. Other film properties measured included rocker hardness, water resistance and film appearance.

In addition to the alkyds, several esters, e.g. dibutyl fumarate and tributyl citrate were evaluated against a soya bean oil. The above work could be considered as a method of increasing the solids content of alkyds which are to be complexed with aluminium compounds.

A question period followed the lecture and the subjects raised included reference to storage stability, durability, odour, brushability, cost, etc. The lecture was concluded by a vote of thanks offered by George Eastwood which met with unanimous approval.

Further information on any items mentioned below may be obtained by circling the appropriate Reader Enquiry Service number on the form at the back of the *Journal*. Enquiries will be forwarded to the organisation concerned.

news

ICI signs Korean paint agreement

The Government of the Republic of Korea has approved the signing of a licence agreement between the leading paint manufacturers of the UK and Korea: ICI Paints Division and Korea Chemical Company (KCC).

Under the terms of the agreement, ICI Paints Division will make available its paint manufacturing technology, which includes some of the most advanced techniques in paint formulation and volume production. The agreement is for an initial five year period and embraces any new manufacturing developments produced by ICI Paints Division during that time.

Particular technology in which Korea Chemical Company is interested includes ICI's patented automotive technology and the multi-purpose millbase process by which a wide variety of pigmented

finishes can be produced from a limited range of basic pigmented concentrates. The agreement will enable KCC to enter immediately into a number of new fields of paint manufacture and to modify production where appropriate. ICI will exchange engineering and technical support staff as part of the licence package.

"Such agreements are becoming an important source of revenue for ICI in a business in which export of finished products and resin intermediates is often restricted by transport costs, import controls and local competition," said Terry Burrowes, Paints Division's overseas manager. ICI has numerous agreements of this sort throughout the world in addition to owning wholly or joint venture interests in more than twenty overseas manufacturing companies.

Reader Enquiry Service No. 31

325 mesh mica

Croxton & Garry Ltd have been appointed sole distributor for a new source of white 325 mesh water-ground mica from Taiwan.

In paints and foundry coatings the fine

mica laminae orientate themselves parallel to the paint film, thus forming an inert, tough and flexible barrier able to withstand stressing, chemical attack and UV light. The use of water-ground mesh in wallpaper is chiefly to give a pearly or silky appearance to the paper, while in the rubber industry it is used largely as a processing lubricant.

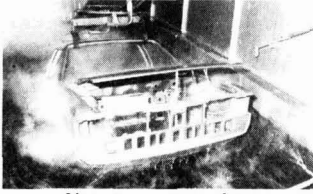
Reader Enquiry Service No. 32

Speciality monomers

Rohm and Haas, who claim to be the world's largest producer of acrylate and methacrylate monomers, has announced that it has under construction a new speciality acrylic monomer plant at its new Bayport, Texas production facility.

The first production unit will come on stream in the fourth quarter of 1981, and additional facilities will be commissioned during the second quarter of 1982; initial production will involve hydroxyl alkyl acrylates, hydroxyl alkyl methacrylates, and certain unique monomers. The design concepts and plant site utilised were chosen to allow wide latitude for manufacture of expected new products.

Reader Enquiry Service No. 33



New pretreatment plant

Full-dip pretreatment

Significant improvements have been achieved by the installation of a new pretreatment plant built by Dürr/Stuttgart for the bodies of the VW Golf Cabriolet and Scirocco, at the factory of the specialist body builder Wilhelm Karmann GmbH at Osnabrück, West Germany.

The improvements apply to both product and factory. In the case of the former, plant and process are designed to fully treat the least accessible surfaces, corners and cavities of the shell, all box sections are reached and pretreated. This, combined with the use of cathodic dip treatment in the application of the primer paint coat results in more complete coating of the shell to an optimum quality level. But equally important are the energy savings, i.e. a 20 per cent reduction, compared with the pretreatment process previously used. The process stages are as follows: degrease, rinse, zinc-phosphate, rinse, passivating and demineralised water rinse.

Reader Enquiry Service No. 34

Silberline double event

The double event at Silberline Ltd on Friday 15 May, was an occasion when the employees and the home town of Leven in Fife could feel justifiably proud of the meteoric growth of the Company since its beginnings in Europe.

The company specialises in the production of high quality non-leafing aluminium paste pigments and its principal market is in metallic top coat and repair paints for the European automotive industry.

Since the first shipments were made from Leven in 1976, a compound growth of 40 per cent has been recorded and to cope with rapidly increasing demand for



The employees of Silberline surrounding Sir John Gilmour, Mr E. Scheller, chairman of Silberline, holding the award, Dr D. King managing director and Mr A. Fletcher who opened the new building

its Sparkle Silver products the company built a new factory, warehouse and laboratory complex of 33,000 sq. ft.

The second highlight of the day was the presentation by Sir John Gilmour, Lord Lieutenant of Fife, of the Queen's Award for Export Achievement to the company and its employees.

Silberline management have concentrated on exporting to the European market and exports make up 90 per cent of shipments.

Reader Enquiry Service No. 35

Vegetable oilseed

A new 600 square metre purpose-built research & development facility for the vegetable oilseed processing industry has been officially opened by Simon Rosedowns Ltd at their Hull UK, premises.

The new centre incorporates a modern, well-equipped laboratory which has facilities for the examination and analysis of all types of oilseed, animal fat and vegetable oils and is equipped to carry out the full range of objective testwork related to the pretreatment, extraction and refining of such materials on a small scale.

A general-purpose chemical test house is fully equipped with services which include the installation of permanent pilot plant and the facility for the construction of pilot plant for short-term experimentation.

A variety of small screw presses and equipment for the preparation of oil-bearing material for either mechanical or chemical extraction, by any specific route, are housed in the mechanical test bay. They allow the simulation of commercial operating conditions so that variables affecting this crucial stage of the complete process can be studied.

The facilities are available for collaborative investigations into improving clients existing operations or ascertaining the feasibility of future expansion plans.

Reader Enquiry Service No. 36

Hoechst UK's new northern HQ

Hoechst UK's newly completed offices and laboratories at Stainland Works, Holywell Green, Halifax, were officially opened by Mr Donald Thompson, MP for Sowerby on Friday 12 June.

Installations include a surfactants and a pigment preparation plant, offices, technical service laboratories and extended warehousing. With the transfer of some of the staff and equipment from Hoechst UK's former Old Trafford offices, the Stainland site is now established as the company's northern headquarters.

Reader Enquiry Service No. 37

news

Automatic paint plant order

TBMA (UK) Ltd of Stafford has won a major order worth over £0.75M to design, install and commission a fully automated paint manufacturing plant for Crown Paints of Darwen, England.

The order, received after five months of detailed project design in consultation with Crown engineers, is for a plant which will control the manufacture of the company's oil-based paints from initial pigment input through to filling lines.

The plant will be fully computer controlled allowing the manufacturing process to be operated automatically and presenting major benefits in areas such as recipe control, product quality, selective routing and stock control.

The microprocessor system will consist of the main processing panel or master console, plus satellite panels complete with mimic diagrams and VDU terminals for controlling the powder and liquid handling through the complete manufacturing process to the storage of the finished products.

Reader Enquiry Service No. 38

Carrier Engineering Ltd change name

Carrier Engineering Ltd, who claim to be the world's leading designer and supplier of paint finishing plant, has changed its name to Haden Drysys Ltd.

This follows a change in the name of the company's £250m. parent group from Haden Carrier Ltd, to Haden Ltd.

Haden Drysys, under its previous name, has been active in the paint finishing plant business in the UK and overseas for over 50 years. Its principal activity is the design and supply of finishing lines for the automobile industry. In recent years it has also made significant inroads into other sectors of the paint finishing plant market.

George Haynes managing director, is reported to have said "the company's recent contracts include the largest order ever placed for paint shops: the General Motors new plant at Antwerp and the Opel plant at Frankfurt", he added, "our latest success is securing the paint plant for the new Honda factory in the USA, an order worth £14 million".

Reader Enquiry Service No. 39

news

Volstatic expands

Volstatic Coatings has appointed additional overseas agents for their products in Germany, South Korea and the United States of America.

Test facilities are being set up in Germany and Korea, and a fully equipped laboratory has been operational for some time in the USA.

Reader Enquiry Service No. 40

new products

New mixer from Millroom/Fillworth

Millroom Accessories & Chemicals Ltd recently joined forces with Gleeffield Ltd, the new company has strengthened its association with Fillworth Ltd and is now an agent for this well-known company and their famous Matchmaster, under driven, glandless mixer.

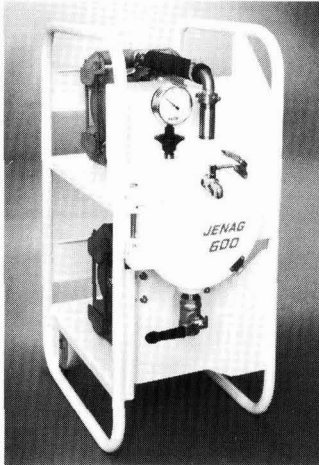
This first joint project between Millroom Accessories and Fillworth is the development of a new mixer based on the successful design principles of the Batchmaster mixing vessel. The new machine, named Batchranger, includes the added facility of being able to be used with a change pan system. Features designed into the new mixer include: a substantial top bearing assembly and shaft to eliminate the need for a bottom bearing, and an accurately machined mixing head with a fluid balanced impeller rotating in a static chamber. The unique design of the chamber enables materials to be mixed, sheared and circulated to ensure a consistent and uniform high quality product. The machines are available from 1-25HP and include contact parts in either mild or stainless steel.

Reader Enquiry Service No. 41

Latex for water based tile adhesive

A new acrylic/styrene latex, Texigel 13-037, is now available in the United States. Texigel 13-037 has been developed by Scott Bader Co. Ltd for use in the production of ceramic tile adhesives. By using Texigel 13-037, the adhesive manufacturer can now offer a water based product which, it is claimed, shows outstanding early water resistance.

Reader Enquiry Service No. 42



Mobile liquid strainer for small batches

New strainer from Jenag

A new range of mobile liquid strainers has been introduced by Jenag Equipment Ltd, a member of the BTR group. Designated Jenag 600, the range has been designed specifically for straining very small batches of specialised and expensive materials such as printing inks and quality paints, where product and solvent loss during production is a prime consideration.

The Jenag 600 provides an economical and comprehensive system which is self-contained, mobile, simple to install, and easy to operate and maintain. The straining operation is enclosed in an aluminium alloy body with stainless steel/gunmetal fittings and PTFE/butyl seals. Standing just 34 inches high, the unit can strain a wide range of fluids within a viscosity range of 0-100 poise, and can handle batches of as little as 50 litres at a rate of 800 litres per hour depending upon the viscosity.

There are two basic models in the 600 range: the 632, which is fitted with air operated pumps which need no electrical connection and which also eliminate risks of explosion in hazardous areas; and the 642, which is electrically driven, special electrical enclosures being provided according to application.

Reader Enquiry Service No. 43

Non-contact thermometer

A new non-contact thermometer the E2T Pulsar 7000 is now available from Auriema Ltd. This model exceeds the temperature limits of thermocouples in a single continuous range and can be mounted at a considerable distance from the target.

With a single scale of 150-1650°C and a choice of spectral ranges, the model 7000 can be used to measure the

temperature of cooler objects in furnace flames, objects that must be viewed through glass, fast moving objects, objects in corrosive atmospheres and a host of other applications.

Standard features include millivolt and milliamp outputs (both linear), adjustable alarm setpoint, readout which can be switched between °C and °F, adjustable response time, emissivity adjustment from 0.1 to 1, small target size, and a focussing range from three inches to infinity.

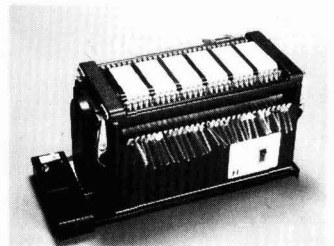
Reader Enquiry Service No. 44

Decapsulation solvent

Industrial Science has announced a decapsulation kit that dissolves most cured plastics used in the packaging of electronic assemblies. This kit is invaluable for failure analysis, depotting for repair and retrieval, chemical deflashing and cleaning equipment.

Materials removed by these solvents include epoxies, both cast and transfer moulded, silicones, RTVs, varnishes, urethanes, elastomers, coatings and foams. Some solvents are selective and attack only one type of plastic while others dissolve several.

Reader Enquiry Service No. 45



New long life 30 channel peristaltic pump

New peristaltic pump

A 30 channel peristaltic pump for routine analytical operations has been introduced by Horstmann Medical & Laboratory Equipment. As well as offering a long reliable life, the unit incorporates easy to change tubes and a built-in electronic leak detector as an operational extra.

Reader Enquiry Service No. 46

Vacuum suction pads

Testbourne has introduced new vacuum suction pads called Lavenco. They are versatile units which, it is claimed, are capable of lifting and moving heavy or light, rough or delicate, clean or oily, work-loads of metal, glass, plastic, ceramic, rubber, paper, cardboard, etc. The load to be lifted can be in strips, sheets, blocks, machined or moulded forms. Complete manufactured products such as television sets, white goods, cars, instruments or sub-assembly parts can be lifted by these simple suction pads.

Reader Enquiry Service No. 47



The Pentest from Electro-Physik

Manual coating thickness gauge

The Pentest is an easy-to-use coating thickness gauge for measuring the thickness of paint and other non-magnetic coatings applied to a steel base in the range 25-700 microns. The gauge doesn't require any power source as it operates by means of a permanent magnet. It is 143mm long and 12mm in diameter.

To take a reading, the Pentest is placed on the coating at right angles to the surface and an outside slider is moved down the gauge until the magnet sticks to the surface with a "click". The slider is then moved upwards until another "click" is heard, when the coating thickness is indicated on the scale. The measuring tolerance is better than 15 per cent of the reading and the gauge can be used in any position, including overhead.

Reader Enquiry Service No. 48

A cure for leaking roofs

Witco Chemical have just introduced a new high performance range of roof coatings to the UK and Europe. The coatings marketed under the Futura Flex and Elasto Bond names, are claimed to be fully proven in the United States where they have a long established reputation as America's top roof coatings.

Formulated for use in conjunction with urethane insulation systems, the coatings give roofs all-year round, all-weather protection in any climate.

A recent survey of roofs in the United States revealed that leakages occurred in 70 per cent of roofs before they were five years old.

The systems are spray applied, the coating following the contours of the insulation and sealing leak prone areas around flashings, projections and seams. The coatings provide a vapour barrier so

good that roofs prone to severe ponding are not a problem.

Unless properly protected breakdown of the urethane insulation can occur through ultraviolet degradation and the new coatings also provide protection against this.

Reader Enquiry Service No. 49

Printing on metallised surfaces

Swale Chemicals Ltd has developed two primers which overcome the problems encountered when printing on metallised surfaces, especially paper, which have oxidised during storage.

The two primers, TA 3942 and PZ 6590, meet the increasing demand for a pre-primer to key to metallised surfaces and plastics, and it is claimed both have exceptionally good adhesion to metallised paper which has aged without having been overlacquered. They offer the option of overlacquering after the primary process or being applied in-line during subsequent flexographic or gravure printing.

Reader Enquiry Service No. 50



The Säberg Thickness Drill

New thickness testing drill

The Elcometer 195 Säberg Thickness Drill is a new instrument for measuring the thickness of coatings on non-conductive substrates.

It was primarily developed for measuring the thickness of epoxy floor coatings but will measure any material that can be cut with a drill, on any substrate. The minimum thickness recommended is 10 microns with an upper limit of 500 microns. Other applications are the thickness of paint or plastics on wood, and paint on plastic, which is an increasing requirement in the automobile industry.

The advantage the thickness drill has over cutting methods is that whilst it is a destructive test, it only drills a small hole in the material and not a long cut. Repair after measurement is therefore effective

news

and simple and, in a lot of instances, not even noticeable.

The method of measurement is well-known in as much as the angle of cut is directly proportional to the height, and when viewing the cut through a microscope, fitted with an appropriate graticule, the measurement of the slope is easily taken. The graduations are spaced so as to give a direct reading of the thickness of the coating.

Reader Enquiry Service No. 51

literature

Structural resin index

The British Resin Manufacturers' Association has compiled a "Structural resin index" which forms a comprehensive guide to manufacturers of structural resins in the UK. It lists the names and addresses of the manufacturers and over 400 products, together with detailed specifications.

Reader Enquiry Service No. 52

PRA publications

The Paint Research Association recently announced the publication of two new titles and the intention to release a third very soon. These are respectively: "Microprocessors in the control of resin manufacture", the result of a PRA working party set up to evaluate the use of microprocessors. "Evaluation of some artificial weathering cycles". "Soiling of paint films" this publication is a review of existing literature on the subject together with details of laboratory work carried out by the PRA at its laboratories.

Reader Enquiry Service No. 53

I.Chem.Eng. publications

The Institution of Chemical Engineers has published a new edition of the well-known "Model form of conditions of contract for process plant suitable for lump-sum contracts in the UK". The original edition which came out in 1968 has been very successful, particularly with smaller firms without qualified legal staff to draw up contracts.

Also recently published were the following 3 titles "Particle technology", "The mixing of particulate solids" and "Fluid mixing".

Reader Enquiry Service No. 54

OCCA news

OCCA-34 Exhibition

27-29 April 1982

Cunard International Hotel
Hammersmith, London W6

*THE INTERNATIONAL FORUM FOR THE
SURFACE COATINGS INDUSTRIES*



General information

The Exhibition Committee of the Oil and Colour Chemists' Association is pleased to announce the arrangements for the 34th Annual Exhibition which will be held from 27-29 April 1982 at the Cunard International Hotel, Hammersmith, London W6.

The Cunard International Hotel is able to offer both exhibitors and visitors to the Exhibition a selection of restaurants, a coffee shop, bars, shopping facilities and other services available in most hotels.

As well as the traditional type of stands, several suites and rooms will be available for those companies who wish to use that type of facility to exhibit, or to entertain their visitors in addition to their stands.

Theme for the Exhibition

The aim of the Exhibition is the presentation of commercial and technical information relating to raw materials, plant

and equipment used in the paint, polymer, printing ink, colour, adhesive and allied industries, both in their manufacture, processing and application.

The Exhibition Committee will be particularly pleased to welcome exhibits from companies relating to the new energy efficient, low-polluting technologies, including powder coatings, high solids coatings, radiation curing, water-based coatings and other developments.

International forum

An analysis of the registration cards completed at the entrance to the 1981 Exhibition showed that visitors to the Exhibition were drawn from the following countries.

Argentina, Australia, Austria, Belgium, Canada, Cyprus, Denmark, Egypt, Eire, Finland, France, East and West Germany, Hungary, Iceland, India, Israel, Italy, Japan, Kenya, Libya, Netherlands, New Zealand, Nigeria,

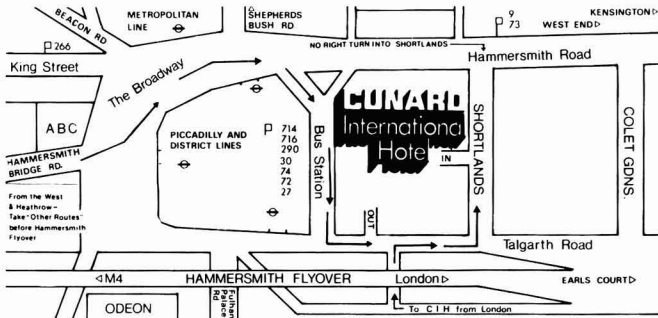
Norway, Poland, Portugal, South Africa, Spain, Saudi-Arabia, Sweden, Switzerland, Turkey, UAE, Uruguay, USA and Zimbabwe.

Over 16 per cent of visitors completing cards came from overseas and an analysis of cards (both from the UK and overseas) by job function confirmed that the OCCA Exhibition has not only a wide appeal but is also able to attract the top level of the industries, as follows:

Description	Percentage
Director/Owner	15.11
Management	21.90
Section Head	
Group Leader	3.87
Chemist/Physicist/ Technologist	18.48
Lab Assistant/ Technician	11.75
Sales & Marketing	18.73
Buyers	2.41
Administration/ Secretarial	2.10
Lecturer/Student	0.63
Other	1.08
Cards not completed	3.94



The Cunard International Hotel, Hammersmith, London, venue for OCCA 34, 27-29 April 1982



Location of the Cunard International Hotel

The products manufactured by visitors were:

	Percentage
Coverings and Coatings	5.14
Resins	6.79
Pigments and Dyes	8.76
Dispersants and Solvents	1.46
Inks and Graphic materials	8.19
Plastics	1.33
General chemicals	25.65
Other	10.86
Cards not completed	10.86

Dates and times

The thirty-fourth annual OCCA Exhibition, which will be a three-day event, will be open as follows:

Tuesday 27 April 1982 . . 09.30 to 17.30
 Wednesday 28 April 1982 09.30 to 17.30
 Thursday 29 April 1982 . 09.30 to 17.30

Travel facilities

The Cunard International Hotel is situated near Hammersmith Station on the Piccadilly Underground Line, between Heathrow Airport and the centre of London. Visitors from overseas may board the Piccadilly Line at Heathrow Central station in the Airport complex, which will take them direct to Hammersmith station or to central London where they may be staying. Car parking space at the hotel will be limited, but there is a large NCP car park close by in Kings Mall. However, those travelling to the Exhibition by car are advised to leave their vehicles outside central London and to travel to the Hotel by the Underground system.

Discourse Sessions

As an innovation in 1982, the opportunity is being afforded to exhibitors to present short discourses of 30 minutes each in a lecture room at the Hotel on a commercial theme concerning the background to their exhibits, their companies' future development, research programmes, new products etc. These discourses will take place at selected times in the morning periods of the exhibition and will be chaired by members of the Association. Those exhibitors wishing to avail themselves of this facility, for which no charge will be made to exhibitors, should send a state-

ment of the discourse they wish to present and if possible the name of the lecturer and the title of the discourse when submitting their application to exhibit form. The programme will be subject to the approval of the Exhibition Committee and will be published in the *Journal* and in the *Official Guide*.

Association Dinner Dance

Exhibitors will be aware that the Association's Biennial Dinner Dance at the Savoy Hotel, London would normally be held in May 1982, but it has been decided on this occasion to organise the Dinner Dance on Wednesday 28 April (the middle day of the Exhibition) so as to afford exhibitors and others the opportunity of entertaining their customers at this prestigious function. Full details will be circulated to exhibitors. Any other organisations interested in participating and wishing to have further details should inform the Director & Secretary at the Association's offices to enable the necessary forms to be sent to them at the end of 1981. Will exhibitors please note that it is the Committee's wish that they do not organise other social events on the evening of 28 April 1982, so as to afford the maximum opportunity for both exhibitors and visitors to be present at the Association's Dinner Dance, to which the principal



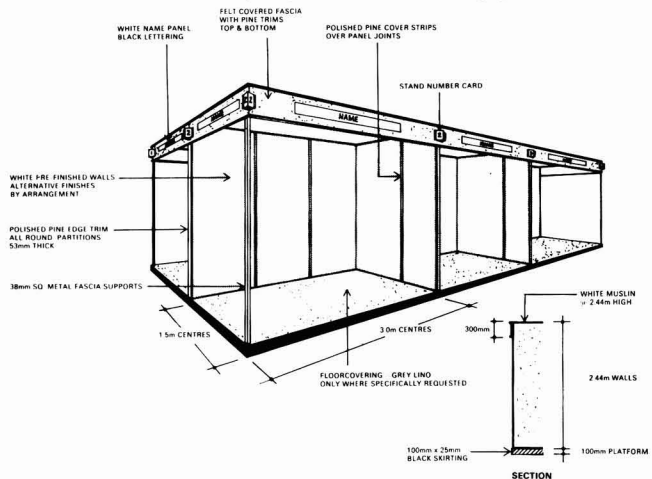
officers of other societies and associations will be invited.

Invitations to Exhibit

Invitations to Exhibit, giving details of the various types of exhibition facilities which will be available at OCCA-34 have now been sent out together with application forms, to those companies who have exhibited at previous OCCA Exhibitions or have requested information for OCCA-34. Any organisation which has not previously shown at an OCCA Exhibition and would like to receive details should write to the Director & Secretary at the address on the Contents page.

Official Guide

It is intended, as in previous years, to publish the *Official Guide* to the Exhibition several weeks in advance so that it may be sent to visitors to enable them to plan the itinerary for their visits. The *Official Guide* will contain descriptions of the exhibits together with much other useful information for visitors, including maps of the exhibition areas, details of facilities, an analysis of exhibits, travel information etc. Advertising space in the *Official Guide* will be offered to those companies participating at the Exhibition, but space may also be available to other organisations. Full details of the availability of advertising space, rates, special positions etc., may be obtained from the Assistant Editor at the address on the contents page.



The standard shell scheme in the New Exhibition Hall

OCCA Conference Diary

BATH

Alternative technologies in coatings

The Beaufort Hotel, Bath was the headquarters and venue for the Association's Biennial Conference which was held from 17-20 June 1981, the other hotels used for accommodation being the Francis Hotel and the Royal York Hotel.

Bath was a new venue for an OCCA Conference and proved to be very popular with delegates, particularly those from overseas, there being representatives from the following fifteen countries: Australia, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Japan, New Zealand, Norway, South Africa, Sweden, Switzerland and the USA. The technical sessions and main social events were held at the Beaufort Hotel and delegates reported favourably on all three hotels, the managements of which made every effort to ensure that an enjoyable conference was held.

Twelve full papers were presented including the Keynote Address by Dr L. Valentine and, in addition, four other short presentations were made to form a discourse session (an innovation at an OCCA Conference). The papers will be published in due course in this *Journal* together with the discussions. At this Association's Conference it has long been the practice to send pre-prints of the papers to delegates several weeks in advance so that the lecturers only

introduced their papers and this allowed for longer discussion periods than at many other conferences. The purpose of the discourse session was to present the four topics in a provocative manner so as to encourage as many delegates as possible to participate in the discussion period and this seemed to have been achieved. The sessions took place in the mornings and afternoons of Thursday and Friday. All of the technical sessions were well attended and it was often necessary for the session chairmen to curtail discussion in order to keep to the times scheduled.

The Association has always arranged a full social programme for the benefit of both delegates and their families and at Bath these included a theatre party and a golf tournament, a trip along the Kennet Canal by long boat and coach tours to Wells and Glastonbury, Longleat House and to the John Harvey Wine Museum at Bristol. As a further innovation, in order to allow those who were attending the Conference to participate in tours outside the times arranged for the technical sessions, a tour was arranged to Chepstow and Tintern Abbey for the Wednesday afternoon and at the same time a works visit to Torrance and Sons Ltd, the well-known West Country machinery equipment manufacturers, took place. The thanks of the Association are recorded to Torrance and Sons Ltd for the excellent

works visit which they arranged for the delegates.

Wednesday 17 June 1981

As mentioned in the previous paragraph there were two events (the Chepstow tour and the works visit) for those delegates and their families arriving on the Wednesday afternoon.

The first main function of the Conference was the customary reception of Overseas delegates by the President, Honorary Officers of the Association and the Director & Secretary, which was held in the Badminton Suite of the Beaufort Hotel. The Association was pleased to welcome representatives of other societies in the International Alliance: Mr G. K. Thomsen (President of SLF), Mr W. H. Ellis (President of FSCT) and Dr K. Meguro (Vice-President of the Japan Society for Colour Material) together with their ladies. Prof M. Toussaint (President of FATIPEC) was not able to be present at the reception but joined the Conference later in the evening.

After dinner, a meeting of the lecturers and the session chairmen was called by the Honorary Research & Development Officer (Mr C. N. Finlay), at which the way the technical sessions of the Conference would be conducted was discussed.



A group photograph of the lecturers and chairmen of the technical sessions

Front Row (left to right): Mrs Ramig, Dr A. Ramig, Mr J. R. Taylor (incoming Hon. Research & Development Officer), Mr D. S. Newton (Hon. Editor), Dr L. Valentine (Keynote Lecturer), Dr F. M. Smith (President), Mr C. N. Finlay (Hon. Research & Development Officer), Mr A. C. Jolly, Mr F. D. Timmins, Dr G. de Winter Anderson, Dr M. L. Ellinger
 Back Row (left to right): Mr D. N. Buddles (Assistant Editor), Mr A. Noomen, Mr A. G. North, Mr M. Camina, Dr H. Schafer, Dr N. Reeves, Dr J. Wilcock, Mr P. Fink-Jensen, Mr J. Lister, Dr B. E. Bailey, Mr G. A. Zerlaut, Mr R. H. Hamblin (Director & Secretary)



Overseas Reception: Back Row (left to right): Mr J. R. Bourne (Hon Secretary), Mr D. J. Morris (President Designate), Mr W. H. Ellis (President FSCT), Dr F. M. Smith (President), Mr G. K. Thomsen (President, SLF), Dr K. Meguro (Vice President JSCM), Mr C. N. Finlay (Hon. Research & Development Officer), Mr R. H. Hamblin (Director & Secretary)

Front Row (left to right) Mrs Bourne, Mrs Morris, Mrs Ellis, Mrs Smith, Mrs Thomsen, Mrs Meguro, Mrs Finlay

Thursday 18 June 1981

At 9.15 a.m. the President welcomed delegates to the Conference and declared the Conference open before handing over to Mr C. N. Finlay, who had arranged papers for the technical sessions, and who acted as chairman of the first session. At the AGM, the Association recorded their thanks to Mr Finlay who had arranged the papers for the three Conferences since 1975, by the conferment of a Vice-Presidency upon him in recognition of his six years' service as Hon. Research & Development Officer. During the morning a canal trip on the long boat "Jane Austen" was organised for delegates' families and this proved very enjoyable, the features being the number of swans encountered on the canal and the picturesque scenery.



The Director & Secretary (Mr R. H. Hamblin) right with his younger son, Mr N. H. Hamblin, who helped with the organisation of the social events

The Association is once again indebted to Mr N. H. Hamblin (the younger son of the Director & Secretary) who took charge of coach parties and the canal trip, as well as giving general assistance on social activities.

After the first technical session the President and Mrs Smith welcomed all those attending the Conference in an informal reception.

In the afternoon delegates' families were able to take a coach tour to Wells

and Glastonbury and partake of a magnificent West Country tea.

The technical session in the afternoon comprised four papers with Dr G. de Winter Anderson (managing director of the Paint Research Association) in the chair.

After the session a meeting was held of the International Liaison Committee which was attended by delegates for FATIPEC (Prof. M. Toussaint and M. J. Roire, a Past President), for the SLF (Mr G. K. Thomsen, President) for JSCM (Dr K. Meguro, Vice-President) for FSCT (Mr W. H. Ellis, President) and for OCCA (President, President Designate and Director & Secretary).

In the evening a party was arranged for the Theatre Royal, Bath, one of the oldest theatres in the country whilst other delegates visited the John Harvey Wine Museum at Bristol.

Friday 19 June 1981

The third technical session, under the chairmanship of Mr F. D. Timmins (Mebon Paints Ltd) comprising one full paper and the discourse session described earlier, took place in the morning. For the families of delegates a guided tour of Bath was arranged.

At 12.30 p.m. the President and Mrs Smith held a reception for council members, overseas Presidents, session chairmen and lecturers.

In the afternoon the final technical session of four papers was chaired by Mr A. C. Jolly (Synthetic Resins Ltd). The families of delegates were able to take a coach tour to Longleat House and another West Country tea!

The Association records its thanks to the Hon. Editor (Mr D. S. Newton) and to Mr J. R. Taylor (the incoming Hon. Research & Development Officer) who helped at each of the technical sessions by distributing question forms for the discussion and to the Assistant Editor (Mr D.

**OCCA
news**

N. Buddles) who assisted lecturers with the presentation of slides, recorded the discussions, was present throughout the sessions to help delegates and accompanied the party to the John Harvey Wine Museum.

Immediately following the final technical session, the Association held its Annual General Meeting at 4.22 p.m., a



Dinner Dance Friday (left to right): The President (Dr F. M. Smith) Mrs Smith, The Mayor of Bath and the Mayoress of Bath (Councillor and Mrs L. Ridd) who received the delegates at the Reception prior to the Dinner

full report of which appears elsewhere in this *Journal*. In the evening the final event of the Conference took place, the Association Dinner and Dance, which was held in the Somerset Suite of the Beaufort Hotel. Prior to the Dinner, guests were received by the President (Dr F. M. Smith) and Mrs Smith, together with the Mayor and Mayoress of Bath.

After the dinner, following the loyal toast by the President, the toast to the Association was proposed by Mr G. K. Thomsen (President of SLF) who compli-



Mr D. Johnson (President of the Paintmakers Association) and Mrs Johnson at the reception on Friday, 19 June



The main speakers at the Association dinner were: Mr G. K. Thomsen, Dr F. M. Smith, Prof. M. Toussaint and Mr W. H. Ellis

mented the Association on the organisation of the Conference and the opportunity to meet so many members from different societies in the world connected with the industries. The President replied on behalf of the Association and thanked Mr Thomsen for proposing the toast to the Association in such a charming manner. He welcomed delegates, lecturers and chairmen of sessions and thanked them all for their contribution to the success of the Conference. He extended a particular welcome to the President of the Society of Dyers and Colourists, Dr J. V. Butcher and Mrs Butcher, and to the President of the Paintmakers Association of Great Britain Ltd, Mr D. Johnson and Mrs Johnson, as well as to the Presidents and representatives of those societies in the

International Alliance; he also had a special welcome for the ladies who added colour and grace to the occasion. His speech was witty and referred to his travels to overseas sections of the Association and other organisations, and he ended by proposing a toast to the Association's guests and the ladies. Replying on behalf of the guests, Prof. M. Toussaint (President of FATIPEC), extended the thanks of all the guests for the hospitality shown by the Association during the week and he hoped that the co-operation which existed between the bodies in the International Alliance would continue and increase in the years to come. He extended a welcome to those present to the FATIPEC Congress to be held in Liege 9-14 May 1982. The final speaker was Mr W. H. Ellis (President of

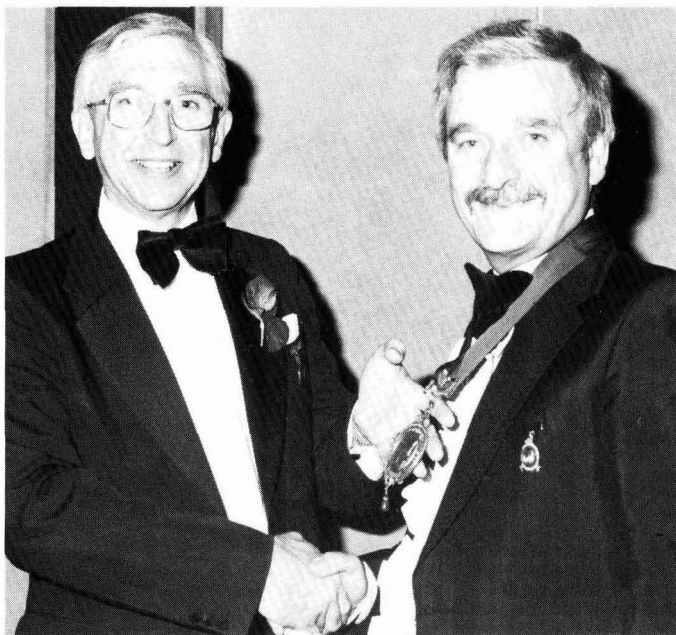
FSCT) who conveyed the greetings of the Federation to the Association in a speech which was warmly received. Following Mr Ellis' speech, the investiture as President of Mr D. J. Morris, who had been elected President of the Association at its Annual General Meeting that afternoon, took place.

Dr F. M. Smith, investing Mr Morris with the presidential insignia, used the traditional form of words:

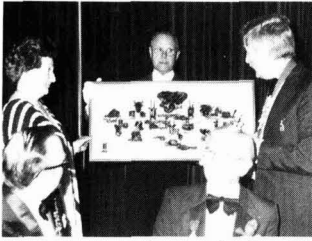
Donald John Morris, in accordance with the resolution passed at the Annual General Meeting this afternoon, it is now my duty to invest you with the insignia as President of this Association and I charge you to guard well the interests of our Association and at all times to uphold the dignity of your high office.

In return, Mr Morris presented Dr Smith with his Past President's medallion inscribed with his name and years of service, which would serve as a memento of his presidency and his work on behalf of the Association. In this he had been ably supported by Mrs Smith and Mr Morris thanked her for the effort and the time which she had devoted to the Association. He presented Mrs Smith with a gift of her choice - a ceramic picture by Bowen Williams commemorating the visit by the President and Mrs Smith to the South African Division. The picture, together with mementos from other overseas visits by Dr Smith and Mrs Smith which were on display, was very much admired.

Mrs Smith thanked Mr Morris and the members of the Association for the presentation; she had very much enjoyed the last two years and the opportunity which had arisen to meet so many members both at home and overseas. She concluded her speech by presenting Mrs Morris with the medallion worn by the President's lady. Mrs Morris thanked Mrs Smith for the medallion and revealed that she had been employed in the paint industry at an earlier stage and thus



The President (Mr D. J. Morris right) being congratulated by his predecessor in office (Dr F. M. Smith) after receiving the Presidential Insignia



The presentation of a ceramic picture by Bowen Williams to Mrs Smith by the President (Mr D. J. Morris)

hoped that she would feel very much at home in her visits to the various sections.

Following the speeches, dancing took place in the ballroom and during the evening the Sam Sharp Golf Trophy and replica were presented by Mrs Morris to Mr S. T. Harris, winner of the competition.

Dancing continued in the ballroom until 1 a.m. when the President wished all those who had attended the Conference a safe journey home.

Saturday 20 June 1981

Following breakfast delegates dispersed and it was expected that many who had attended would be present at the next Conference which is scheduled to take place at York in June 1983. It was generally agreed that the Conference had been highly successful, that the arrange-

ments made and the customary smooth running of the Conference had been attributed in no small way to the efforts of the Director & Secretary (Mr R. H. Hamblin) and the members of the Association staff.



The President of FATIPEC (Prof. M. Toussaint right) talking to the President of the Society of Dyers & Colourists (Dr J. V. Butcher) and Mrs Butcher at the Top Table Reception on Friday, 19 June



Manchester Section cocktail party held in Bath on Friday 19 June; From left to right: Mr Courtman, Mrs Courtman, Mrs Sharp, Mr A. Sharp, Mrs Redman, Dr F. M. Smith, Mrs Smith, Mr F. Redman, Mrs Mitchell, Mr J. E. Mitchell, Mrs Jolly, Mr A. C. Jolly



Mrs Morris (right) after receiving the insignia worn by the President's lady from Mrs Smith

For information on membership of OCCA, enquiries should be sent to the Association's offices, see front cover for address.



Bristol Section

Annual skittles match

The Annual Skittles match between the Birmingham Paint Varnish and Lacquer Club and the Bristol Section was held on 15 May 1981, at the British Petroleum Chemicals Skittle Alley at Stroud, Gloucestershire and was, as usual, a most enjoyable evening with approximately 50 members and their ladies present.

This year the cup was won by the Birmingham PVLC and Mr Graham Fowkes, Chairman of the Bristol Section, handed back the cup to the President, Mr Roy Inglestone, for another year. All present enjoyed themselves and the "unique" cup was returned to Birmingham for their safe keeping. Next year Bristol will try harder!

Annual Ladies' Night

The Annual Ladies' Night was held on 27 March at the Mayfair Suite, the Entertainment Centre, Bristol and was a great success with an attendance of about 140.

The Chairman, Mr Les Brooke,

welcomed in a speech his guests who included, the President of OCCA, Dr F. M. Smith; the President of the Birmingham Paint Varnish and Lacquer Club, Mr Roy Inglestone and his wife; the London Section Chairman Dr T. A. Banfield and his wife; Mr R. L. Devenish



Dr T. A. Banfield (Chairman, London Section) and Mrs Banfield, Mr R. Inglestone (President, BPVL Club) and Mrs Ingleston, Mr L. J. Brooke (Chairman, Bristol Section) and Mrs Brooke, Mrs Devenish and Mr R. L. Devenish (Chairman, Midlands Section) and Mr R. H. Hamblin (Director & Secretary)

OCCA news

and his wife (Midlands Section) and the Director & Secretary, Mr R. H. Hamblin.

Mr Brooke thanked all present for their continuing support of the functions and especially mentioned Mr Tony Lageu and Mrs Lageu for all the work they had put in to make the occasion so enjoyable. The President, Dr Smith replied on behalf of the guests.

J.R.T.

News of Members

Eric Duligal, well-known in corrosion circles in South Africa, England and USA, retired after 11 years service as principal scientist, later chief scientist with the SA Bureau of Standards. As from March 1981 he will be operating as a private consultant in corrosion control and quality assurance.

Professional Grade

At the meeting of the Professional Grade Committee held on 14 July 1981 the Committee authorised the following:

Admitted as Fellows

Hill, Derek Alfred Wheeler (*London*)
Draper, Patrick Albert (*Natal*)

Transfer from Associate to Fellow

Ebdon, James William (*General Overseas – Zimbabwe Branch*)

Admitted as Associates

Davis, Brian Frederick James (*London*)
Shepherd, David William (*Bristol*)
Freund, Kurt Alfredo (*General Overseas – Ecuador*)
Wilkes, David Graham (*Bristol*)
Beadle, Roy William (*London*)

Courses for Licentiatehip

Several colleges of further education are willing to help Registered Students and Ordinary Members of the Association with courses and the preparation of dissertations in respect of Licentiatehip in the Technology of Surface Coatings (LTSC). Details of the courses including those within the TEC framework are available from:

Watford College, Hempstead Road, Watford, Herts WD1 3EZ.
Mr L. Young, Head of Department of Printing and Packaging.

London College of Printing, Elephant and Castle, London SE16.
Mr K. Bradshaw, Science and Printing Department.

Polytechnic of the South Bank, Borough Road, London SE1 0AA. Mr P. Barnes, Department of Chemistry and Polymer Technology.

Manchester Polytechnic, All Saints, Manchester M15 6BR. Mr G. Higginbotham, Department of Polymer Technology.

Manchester Polytechnic, Chester Street, Manchester M1 5GD.
Mr R. Stott, Department of Polymer Technology.

College of Arts & Technology, Maple Terrace, Newcastle upon Tyne NE4 7SA. Mr P. Maycock, Head of Department of Science.

East Ham College of Technology, High Road South, London E6 4ER. Mr G. Wood, Department of Sciences.

The Polytechnic, Wolverhampton WV1 1LY. Dr B. W. Rockett.

Matthew Boulton Technical College, Sherlock Street, Birmingham 5. Mr C. J. Thompson.

Coventry Technical College, Butts, Coventry CV1 3GD. Dr M. J. Hall, Head of Department of Science.

Warley College of Technology, Crocketts Lane, Smethwick, Warley B66 3BU. Dr R. A. W. Longden, Head of Department of Chemistry, Computing and Applied Sciences.

Stow College – Glasgow, 43 Shamrock Street, Glasgow G4 9LD. Mr D. C. Dunn, Head of Department of Management Services.

The following elections to membership have been approved by Council. The Section to which each new Member is attached is given in italics.

GOODMAN, JOHN MORRIS, BSc, 11 Keswick Road, Orpington, Kent (*London*)

GRIEB, DAVID JOHN, BSc, 36 Highfield Road, Caerleon, Gwent (*Bristol*)

GROVER, COLIN DAVIS, BSc, Vinyl Products Ltd, Mill Lane, Carshalton, Surrey (*London*)

LEWIS, IAN DOUGLAS, BSc, 113 Matlock Crescent, Cheam, Surrey SM3 9SY (*London*)

PATERSON, RODNEY G., 77 Davisville Avenue, Appartment 1916, Toronto, Ontario, Canada M4S 1G4 (*Ontario*)

RANDALL, LESLIE, 82 Aberdour Road, Goodmayes, Ilford, Essex (*London*)

Ordinary Members

BATZER, GISELA, 2302,2350 Bridletowne Circle, Scarborough, Ontario, Canada M1W 3E6 (*Ontario*)

BUDDLES, DERRICK NORMAN, BSc, OCCA, Priory House, 967 Harrow Road, Wembley, Middlesex HA0 2SF (*London*)

COLLETT, RICHARD WILLIAM ROBERT, BSc, Blenkinsopp Castle, Greenhead, Carlisle CA6 7JS (*Newcastle*)

FLEMING, KENNETH NOEL, "Carmona", 6 Tyne View Road, Haltwhistle, Northumberland (*Newcastle*)

SO, TZE-KWAN STEPHEN, Cheung Fung Buildings, 13/F Flat D,
85 Tong Mi Road, Kowloon, Hong Kong
(General Overseas)

THOMAS, DAVID JOHN. 12 Huntingdon Drive, Darwen,
Lancashire
(Manchester)

Associate Members

ROWLAND, ROBERT EDWARD, 30 Whalebone Grove, Chadwell
Heath, Romford, Essex
(London)

WINCH, FRANCINE, 33B Holden Road, Woodside Park,
London N12 8HS
(London)



Registered Student

MILES, TERRY JAMES, 50 Penenden, New Ash Green, Dartford,
Kent DA3 8LS
(London)

Section Programmes for the 1981-82 session

Main Association Events

1982

Tuesday 27 – Thursday 29 April OCCA-34 Annual Exhibition at the Cunard International Hotel, Shortlands, Hammersmith, London W6.

Wednesday 28 April Association Dinner Dance to be held at the Savoy Hotel, London WC2.

Wednesday 16 June Annual General Meeting to be held at the Piccadilly Hotel, London W1, following a council reunion luncheon and an Association lecture. *Details to be announced.*

Members are reminded that meetings may be subject to alteration and reference should be made to the OCCA Diary feature published each month in the *Journal* and to the appropriate Hon. Secretary.

It is not intended to send individual circulars to members attached to United Kingdom and Irish Sections for each meeting, but this information and application forms, where applicable, will be displayed on a separate blue leaflet inserted in the *Journal* each month.

Bristol

Unless otherwise stated, all meetings will be held at the George and Dragon, High Street, Winterbourne, Nr. Bristol, North Avon, commencing at 7.15 p.m.

1981

Friday 25 September "Chain stopped alkyds" Mr J. Wilson, of B & N Chemicals Ltd, to be held at the Post House, Cardiff.

Tuesday 20 October "Pigmentation of white printing inks" by T. Entwistle, BTP Toxide Ltd.

Friday 27 November Ladies' Evening, "Natural pigments – from flowers to red wines" by C. F. Timberlake from the Long Ashton Research Station.

Thursday 3 December "Solubility parameters", by P. Kershaw of Shell

Chemicals UK Ltd. A joint meeting with the Birmingham Paint Varnish and Lacquer Club.

1982

Tuesday 19 January "Colour instrumentation" by D. A. Plant supported by BOC (Software Science) Ltd.

Friday 26 February "Pigments paint and protection" by D. Bishop, British Rail to be held at the Post House, Cardiff.

Friday 19 March "Ultraviolet and electron beam – energy efficient methods of curing" by M. V. Holder, Cray Valley Products Ltd.

Friday 26 March Ladies' Night. To be held at the Unicorn Hotel, Bristol commencing 7.15 p.m.

Friday 30 April Annual General Meeting followed by film on veteran cars by BP Ltd.

Hon. Secretary: K. A. Chippington, ATSC, 37 Sheppard Way, Minchinhampton, Stroud, Gloucester GL6 9BZ. (Tel: Brimscombe 3164.)

Hull

Unless otherwise stated, all meetings will be held at the Grange Park Hotel, Willerby, Hull, commencing at 6.45 p.m.

1981

Friday 2 October Annual Dinner Dance at the Willerby Manor Hotel, Willerby, Hull, commencing at 6.45 p.m.

Monday 5 October Joint meeting with the South Humberside Chemical Engineers at the Angel Hotel, Market Place, Brigg, South Humberside, commencing at 6.45 p.m. D. High of British Bridge Builders Ltd will be talking about the technical aspects of the Humber Bridge.

Monday 2 November First Ordinary Meeting. F. Dunstan of Perkin Elmer Ltd will be discussing "The application of modern analytical techniques to the surface coatings industry".

Monday 7 December Second Ordinary Meeting. D. Wilson of Vinyl Products Ltd will be discussing "Some recent developments in pressure polymer emulsions".

1982

Monday 11 January Third Ordinary Meeting. F. J. Morpeth of Foscolour Ltd will be talking on the subject of "The manufacture and uses of pigment chips".

Monday 1 February Fourth Ordinary Meeting. P. W. Munn an independent speaker will be discussing "Paints for concrete".

Monday 1 March Ladies' Evening. Venue to be decided. A local speaker will discuss "Stained glass".

Monday 5 April Annual General Meeting.

Hon. Secretary: C. Goodall, LRSC, AIWM, 53 Main Street, Swanland, North Ferriby, North Humberside. (Tel: business: 0482 561166.)

Irish

1981

Unless otherwise stated, all meetings will be held at the Clarence Hotel, Wellington Quay, Dublin 2, commencing at 8.00 p.m.

Monday 21 September "Development of printing ink varnishes" by Mr I. Drury of Lawther Chemicals Limited.

Friday 23 October "Why thixotropy?" by Mr R. Munn, Cray Valley Products Limited.

Friday 6 November Annual Dinner Dance.

Friday 4 December "Purchasing and quality control" by Mr D. Donnelly, Irish Institute of Purchasing and Materials Management.

1982

Thursday 21 January Technical and commercial business forum

Friday 26 February Ladies' Evening

Friday 26 March "Powder coatings". *Details to be announced.*

Friday 16 April Annual General Meeting.

Hon. Secretary: D. Pountain, 395 Portmarnock Crescent, Portmarnock, County Dublin.

OCCA news

London

Unless otherwise stated all meetings will be held at the Great Eastern Hotel, Liverpool Street, EC2, commencing at 6.30 p.m. Refreshments will be available from 6.00 p.m.

1981

Thursday 24 September Chairman's Evening "Colour and railways" by B. F. Gilliam, Chairman, London Section. The 1981 Jordan Award will be presented at this meeting.

Thursday 22 October "The use of microprocessors in the Paint Industry" by D. C. Lilley, Management Services Manager, MacPherson Industrial Coatings.

Friday 6 November Ladies Night, Abercorn Rooms, the Great Eastern Hotel.

Wednesday 18 November One day symposium at Thames Polytechnic, Woolwich, SE18. "Ink technology - a survey of current practices".

1982

Thursday 14 January "Optimised TGIC levels in polyester powders" by D. Lawlor, Grilon (UK) Ltd.

Thursday 18 February "Developments in artists' colours" by P. Staples, Technical Director, Winsor and Newton Ltd.

Spring Buffet/Disco Dance. *Details to be announced.*

Wednesday 17 March One-day symposium at Thames Polytechnic, Woolwich SE18. "The human factor in management".

Thursday 22 April Annual General Meeting. *Details to be announced.*

Hon. Secretary: A. J. Newbould, BSc, CChem, MRSC, 30 Windsor Park, Worcester Park, Surrey. (Tel: business: 01-476 3031.)

Manchester

Unless otherwise stated, all meetings will be held at the Manchester Polytechnic, New Administration Building, All Saints.

1981

Wednesday 9 September Golf Tournament at Stockport Golf Club. *Details to be announced.*

Friday 9 October Committee Meeting at ICI Ltd, Piccadilly Plaza, commencing at 3.30 p.m.

Friday 9 October Lecture "The potential of sugar as a chemical feedstock" by K. J. Parker of Tate & Lyle, commencing at 6.30 p.m.

Friday 16 October Annual Dinner Dance at the Piccadilly Hotel, Manchester.

Monday 9 November Committee Meeting at Crest Motel, Bolton, commencing at 3.30 p.m.

Monday 9 November Lecture "The dispersion of pigments - theory and practical experience" by L. Gall, BASF, commencing at 6.30 p.m.

Wednesday 11 November Student Lecture "Alkyd resins and their use in surface coatings" by A. G. Robinson, Synthetic Resins Ltd, commencing at 4.30 p.m.

Friday 11 December Whips Meeting at ICI Ltd, Piccadilly Plaza.

Friday 11 December Lecture "Identifying vehicles for paint transfer" by Dr Wright, NW Forensic Science Laboratories, commencing at 6.30 p.m.

1982

Monday 11 January Committee Meeting at Lord Daresbury, Warrington, commencing at 3.30 p.m.

Monday 11 January Lecture "Radiation curing of polymers" by K. O'Hara or M. Holder, Cray Valley Products Ltd, commencing at 6.30 p.m.

Wednesday 20 January Student Lecture "Cellulose esters for liquid inks" by K. Walker, Eastman Chemicals Ltd, commencing at 4.30 p.m.

End of January Winter Committee Meeting. *Details to be announced.*

Friday 12 February Committee Meeting at ICI Piccadilly Plaza, commencing at 3.30 p.m.

Friday 12 February Lecture "Polymers without carbon" by B. R. Currell, of Thames Polytechnic, commencing at 6.30 p.m.

Wednesday 17 February Student Lecture "Carbon black for paint and printing ink systems" by P. Gallagher, Cabot Carbon Ltd, commencing at 4.30 p.m.

Monday 8 March Committee meeting at ICI Ltd, Piccadilly Plaza, commencing at 3.30 p.m.

Monday 8 March Lecture "New two-pack systems without isocyanate" by Dr Mondt, Hoechst, commencing at 6.30 p.m.

March Informal Buffet Dance. *Details to be announced.*

March Annual General Meeting. *Details to be announced.*

Hon. Secretary: E. A. Peters, BSc, Imperial Chemical Industries Ltd, Organic Division, PO Box 42, Hexagon House, Blackley, Manchester M9 3DA. (Tel: 061-740 1460.)

Midlands

Unless otherwise stated, all meetings will be held at the Calthorpe Suite, County Cricket Ground, Edgbaston, Birmingham, commencing at 6.30 p.m.

1981

Thursday 24 September "The DWI can - production and decoration" by L. A. Jenkins, Metal Box Limited, Executive Suite, County Cricket Ground, Edgbaston, Birmingham.

Friday 25 September Ladies' Night, Botanical Gardens, Birmingham. *Details to be announced.*

Thursday 15 October "Driers for paint" by D. J. Love, Manchem Limited.

Thursday 19 November "Living with lead legislation" by A. Cowley from ICI.

1982

Thursday 21 January M. Leveté, Paintmakers Association. *Details to be announced.*

Thursday 18 February "Water thinnable epoxies" by A. Schnelle, Emser Werke AG.

Thursday 18 March Visit to Birmingham College of Food and Domestic Arts. *Details to be announced.*

Thursday 22 April AGM. *Details to be announced.*

Hon. Secretary: B. A. Fowler, 12 Broadoaks, Moss Pit, Stafford ST17 9DW. (Tel: business: 0785 59121.)

Trent Valley Branch

Unless otherwise stated, all meetings will be held at the Sutton Centre, High Pavement, Sutton-in-Ashfield, Nottinghamshire, commencing at 7.15 p.m.

1981

Thursday 8 October "Computers used in colour prediction and formulation control" by J. P. Ferguson of Instrumental Colour Systems.

Friday 30 October Hallowe'en Buffet and Dance. *Details to be announced.*

Thursday 12 November "The painting inspector" by J. Fowles-Smith.

1982

January Joint dinner/lecture with Midlands Section. *Details to be announced.*

Thursday 11 February "Primers for difficult surfaces" by J. R. Bourne of Mebon Paints Ltd.

Thursday 11 March "Radiation cured coatings" by a speaker from Cray Valley Products Ltd.

Friday 16 April Annual General Meeting followed by buffet and dance. *Details to be announced.*

Hon. Secretary: S. Watson, 21 Delamere Drive, Mansfield, Nottinghamshire NG18 4DE. (Tel: business: 0623 753845.)

Newcastle

Unless otherwise stated, all meetings will be held at the students' common room, St. Mary's College, Elvet Hill Road, Durham, commencing at 6.30 p.m.

1981

Thursday 1 October "From this point we can only go up" by L. H. Silver, Silver Paint and Lacquer Ltd.

Thursday 5 November "Cost effective alkyd resins" by A. F. Everard, Berger Resinous Chemicals.

Thursday 3 December "Durability of decorative gloss paints" by E. A. Oakley of BTP Tioxide Ltd.

1982

Thursday 7 January "Occupational health and safety - corporate and personal commitment and accountability" by F. Riddell of Crown Decorative Products Ltd.

Thursday 4 February "OCCA past, present and future" by R. H. Hamblin.

Friday 19 February Ladies' Night at the Five Bridges Hotel, Gateshead. *Details to be announced.*

Thursday 4 March "Decorative paints - market pressures on the formulator" by R. D. Mearns, Goodlass Wall & Co. Ltd.

Thursday 1 April AGM. *Details to be announced.*

Hon. Secretary: S. Lynn, CChem, MRSC, 19 Waskerley Close, Sunnyside, Newcastle upon Tyne NE18 5XX. (Tel: 0632 604791.)

Scottish

Unless otherwise stated, all meetings will be held at the Albany Hotel, Glasgow, commencing at 6 p.m.

1981

Thursday 8 October "Vehicle finishing" by A. Gower and R. Findlayson, Lothian Paints.

Thursday 12 November Joint meeting with SDC "Energy resources - conservation and utilisation" by M. Slessor of the University of Strathclyde, commencing 7.30 p.m.

Thursday 10 December "Pigment dispersion". To be given by a lecturer from Ciba-Geigy.

1982

Thursday 2 February "Haloflex for water based paints". A speaker from ICI.

Thursday 3 March Lecture from Barr & Stroud, Glasgow. *Details to be announced.*

Thursday 4 April AGM followed by Ladies' Evening. "Hypnotism" by A. M. Hearne. *Details to be announced.*

Hon. Secretary: Mrs A. McA. Gibson, Alexander Fergusson & Co. Ltd, 59

Ruchill Street, Glasgow G20 9PY. (Tel. 041-946 2101.)

Eastern Branch

Unless otherwise stated all meetings will commence at 7.30 p.m.

1981

Friday 16 October Annual skittles match in the Murrayfield Indoor Sports Centre, Edinburgh, commencing at 7.00 p.m. prompt.

Wednesday 14 November "Resins for water dilutable flexographic and gravure printing inks" by George Brown of Harlow Chemicals who are sponsoring this lecture, to be held in the Murrayfield Hotel.

1982

Thursday 14 January Joint Scottish Section/Eastern Branch meeting in the Maybury Roadhouse, Edinburgh. "Mossmorran in relation to the North Sea" by J. R. Alywin of Esso Chemical Ltd.

Friday 12 February "Burns Supper" to be held as usual in the Commodore Hotel, Marine Drive, Edinburgh, commencing at 7.30 p.m. *Further details to be announced.*

Wednesday 17 March "Alternative means of controlling paint viscosity/temperature phenomena" by Neil Reeves, NL Chemicals, Livingston, in the Murrayfield Hotel, Edinburgh.

Thursday 4 March Joint Eastern Branch/Institute of Printing meeting in the Albany Rooms, Queen Street, Edinburgh. "Developments in printing inks" by Jeff Hutchinson, Croda Inks.

Wednesday 14 April Annual General Meeting followed by a talk by R. H. Wardman, lecturer Scottish College of Textiles, Galashiels, in the Murrayfield Hotel, Edinburgh.

Hon. Secretary: A. McKendrick, 56 Ormisdale Terrace, Edinburgh EH12 6EF. (Tel: business: 031-554 1131.)

Thames Valley

Unless otherwise stated, all meetings will be held at the Beaconsfield Crest Motel (White Hart), Aylesbury End, Beaconsfield, Buckinghamshire, commencing at 6.30 p.m. for 7 p.m.

1981

Thursday 24 September Visit to Charles Wells Ltd, The Brewery, Bedford.

Thursday 15 October "Colour measurement" by D. A. Plant.

Thursday 19 November "Electrostatic methods" by Volstatic Ltd.

1982

Thursday 21 January *Details to be announced.*



Friday 12 February Annual Dinner Dance to be held at Great Fosters, Egham, Surrey.

Thursday 18 February *Details to be announced.*

Thursday 18 March "Safety forum". Three speakers and a question and answer session.

Monday 15 April AGM. *Details to be announced.*

Hon. Secretary: R. H. Wright, 28 Bradfield Avenue, Buckingham, Buckinghamshire. (Tel: Buckingham 2922.)

West Riding

Unless otherwise stated, all meetings will be held at the Mansion Hotel, Roundhay Park, Leeds 8, commencing at 7.30 p.m. Would members please note that meetings will take place on the first Tuesday in each month.

1981

West Riding Chairman's golf trophy meeting. *Details to be announced.*

Tuesday 1 September "The principles of emulsion polymerisation" by D. G. W. Dargan of Kirklees Chemicals Ltd, commencing at 6.30 p.m.

Tuesday 6 October "Plastic packaging today and tomorrow" by Ove Leth-Sørensen, J. Walker and P. Jones of Superfos Packaging (UK) Ltd.

Tuesday 3 November "Toxicology with particular reference to proposed draught EEC regulations dealing with labelling and packaging for paint products" by P. Bourne of Shell Chemicals (UK) Ltd.

Tuesday 1 December "The storage and uses of flammable materials in industry" by D. Gill, assistant chief officer, Fire Service Dept., Birkenshaw.

1982

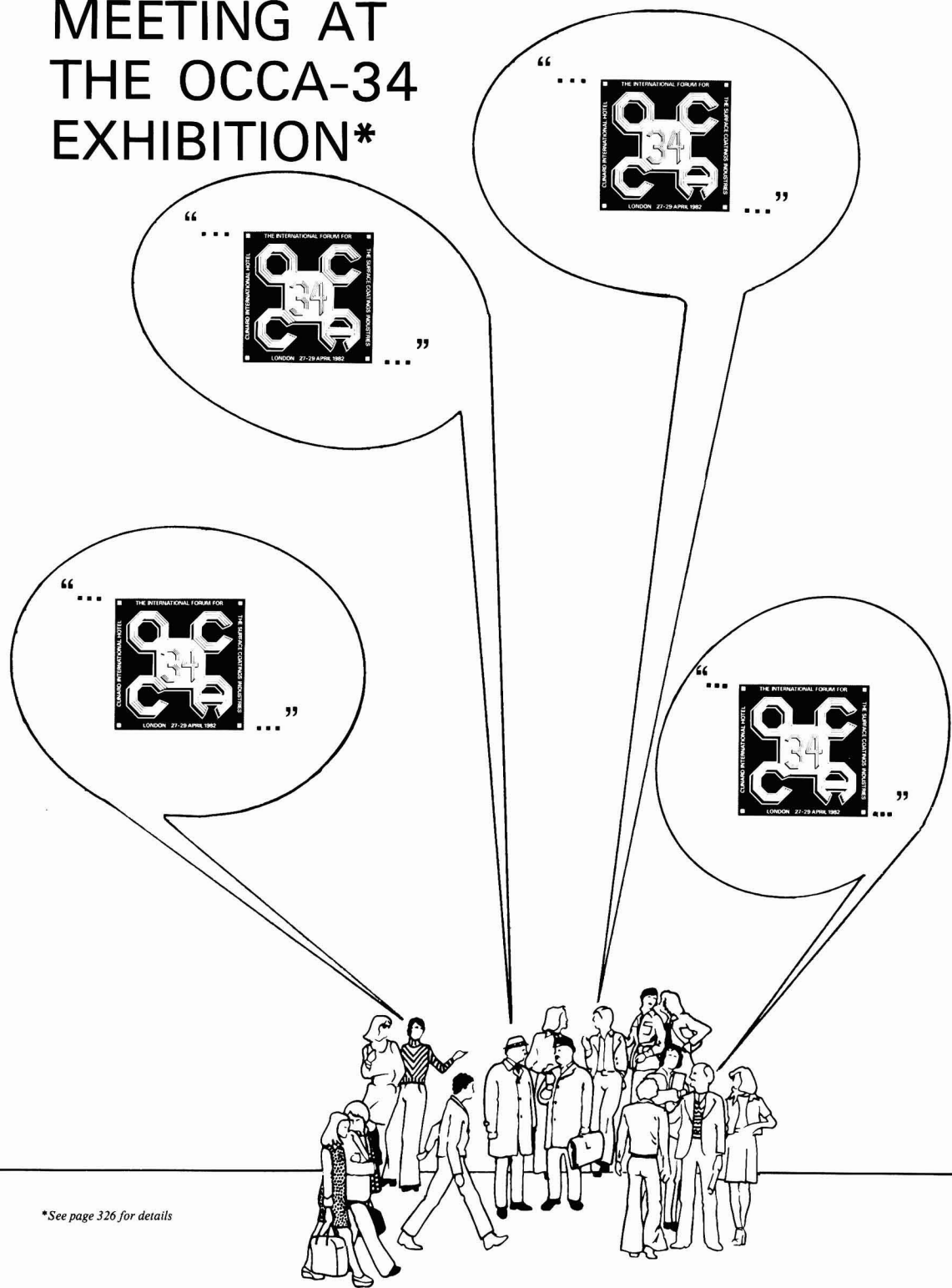
Tuesday 2 February "The financing, organisation and work of the Paint Research Association" by G. de W. Anderson, managing director of the PRA.

Tuesday 2 March "Paint containers present and future" by W. J. Walton, marketing executive of the Metal Box Co. Ltd.

Tuesday 6 April Annual General Meeting.

Hon. Secretary: T. Wood, BSc, MRSC, 26 Kingstonia Gardens, Ripon, N. Yorkshire. (Tel: home, Ripon 4241 - business: Morley 534423.)

THEY'RE ALL TALKING ABOUT MEETING AT THE OCCA-34 EXHIBITION*



*See page 326 for details

CLASSIFIED ADVERTISEMENTS

Classified Advertisements are charged at the rate of £5.00 per single column cm. Advertisements for Appointments Wanted are charged at £1.50 per line. A box number is charged at £1.00. They should be sent to D. N. Buddles, Assistant Editor, Oil & Colour Chemists' Association, Priory House, 967 Harrow Road, Wembley, Middlesex HA0 2SF. JOCCA is published EVERY month and Classified Advertisements can be accepted up to at least the 12th, and in exceptional circumstances the 20th of the month preceding publication. Advertisers who wish to arrange for an extension of the copy deadline should contact the Assistant Editor, D. N. Buddles at the address given above (telephone 01-908 1086, telex 922670 OCCA G).

APPOINTMENTS

Paint Technologist

Fast-growing Zimbabwe is arguably southern Africa's most beautiful country with a climate to match. Our Salisbury-based clients (associated with a large international industrial group) now seek an experienced Paint Technologist for long-term challenge and high rewards.

To qualify, you must have gained extensive experience in paint technology, covering general paint testing and manufacture. Additionally you must possess more than a working knowledge of general coating formulations, as well as an in-depth knowledge of one or more of the following paint types: decorative (solvent and water-based); heavy duty coatings; industrial paints, wood finishes or container coatings. Any formal paint technology qualification or a BS



RECRUITMENT ADVERTISING SPECIALISTS

(Chemistry) is also highly desirable. A competitive salary is offered together with these excellent benefits ● free air passages ● generous removal expenses ● 4 weeks' free accommodation on arrival ● settling-in allowance ● annual bonus ● home ownership scheme ● medical, pension/life cover ● outstanding sports and recreational facilities, etc.

For an application form, send full personal and career details (including phone number) now to: Robert Reddick, Bull Holmes Bartlett Limited, 45 Albemarle Street, London W1X 3FE, quoting ref. ZIM/PAINT, clearly on your envelope and listing any companies to whom you do not wish to apply in a covering note. Interviews will be conducted in the U.K.

EQUIPMENT FOR SALE

FOR SALE

2 Off - 60 gallon Heavy Duty Planetry Cox Mixers, complete with Pans.

Triple Roll Mills, new and reconditioned, 40", 30", 24", and Hyd. Lab. Mill.

Vickers Keenomix Planetry Mixer.

Monteni Bead Mill 15 Litre Two Containers.

Hobart 12 Litre Mixer.

Contact:
Mr E. Newton,
Engineering London Limited,
60 Verney Road,
London SE16 3DL
Tel: 01-237 5171

WANTED: AUTO-FINISHING CHEMIST FOR VENEZUELA

The opening, available immediately, is for a technician-chemist with experience in the automobile coatings field. The position is for a group leader in the Central Laboratory of the Montana Paint Factory in Valencia, Venezuela.

Responsibilities include formulations, licensing changes and technical service for a leading American car manufacturer. We are seeking a dynamic, independent specialist, oriented towards production and technical application with a flexible working approach.

An excellent compensation package is offered in addition to relocation expenses. Please send complete resume with salary requirements in strict confidence to our contact:

Mr J. F. Materna, 238 Fair Oak Road, Eastleigh, Hants, Tel: 0703 692210.

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International trade fair for the paint, paint products and printing-ink industries.

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