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**OCCA-33 EXHIBITION**

**28-30 APRIL, 1981**

*THE INTERNATIONAL  
FORUM*

*FOR THE SURFACE COATINGS  
INDUSTRIES*

See Page 362 for details



# JOURNAL OF THE IL & COLOUR CHEMISTS' ASSOCIATION

Copolymers of polystyrene glycol and glycerol phthalate resins in surface coatings

*S. Chandra and S. Pasari*

Deposition efficiency of powders in the electrostatic powder coating process

*J. A. Cross, Sampuran-Singh and Abu Bakar Ahmed*

Solving air pollution problems in the manufacture and use of surface coatings

*N. A. R. Falla*

New metal complex pigments

*A. M. Naser, A. A. Salman, I. M. Abd-Allah, M. A. Abd El-Ghafa and A. N. Khouzondar*

American study on mortality rates in the coatings industry, preliminary details published (*Short Communication*)

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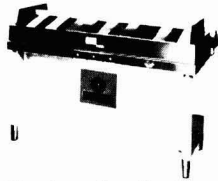
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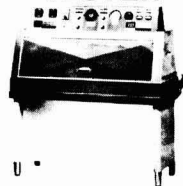
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## BATH 17-20 JUNE 1981

### Alternative technologies in coatings

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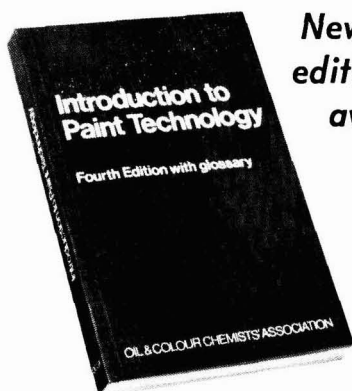
The next OCCA Biennial Conference will be held at the Beaufort Hotel, Bath from 17 – 20 June 1981 with the theme "Alternative technologies in coatings".

The future holds both opportunity and challenge for alternative technologies and topics covered by the Conference should include, EEC regulations covering the introduction of new chemicals, alternative means of obtaining opacity, the impact of microprocessors and computers on processing and application methods, high solids coatings, aqueous systems, radiation curing and powder coatings.

A departure from the usual conference format will be the inclusion of a "Discourse" session with the sub-title "Alternatives to coatings", where the use of techniques such as cathodic protection and substitution of coated items by plastics could be discussed.

The Hon. Research & Development Officer now invites offers of papers for presentation at this Conference. Anyone wishing to submit a paper for consideration should notify his intention as soon as possible to: **The Director & Secretary, Oil & Colour Chemists' Association, Priory House, 967 Harrow Road, Wembley, Middlesex HA0 2SF, England (Tel: 01-908 1080; Telex: 922670 OCCA G).**

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The Association organises an international Conference every two years and preprints of the papers are prepared for delegates. A strictly limited number of the following are available to those who wish to have the complete bound sets of papers.

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1st  
inkmaker

**“Have you met  
Ciba-Geigy’s new  
tea lady?”**

2nd  
inkmaker

*“No, what’s so special about her?”*  
*“Well, every inkmaker seems to be going  
on about her.”*

*“Really, what’s her name?”*

*“Big strong Flo, they call her! Must be quite a woman.”*

*“You are out of touch, Cecil. That’s not the tea lady they’re on  
about. It’s Ciba-Geigy’s new Irgalite Yellow BTN.”*

*“New yellow?”*

*“Yes, everyone’s using it. Except you! It’s great for  
strength with excellent flow and transparency.”*

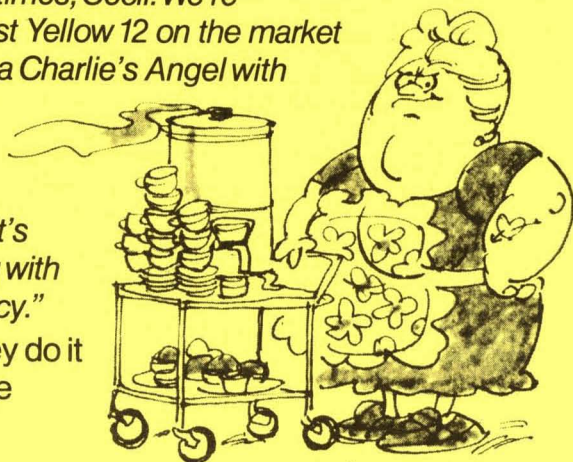
*“It sounded like a tea lady.”*

*“You’re always behind the times, Cecil. We’re  
talking about the strongest Yellow 12 on the market  
and all you can think of is a Charlie’s Angel with  
a tea trolley!”*

*“Irgalite Yellow BTN eh,  
China or Indian?”*

*“Neither you fool! Neither. It’s  
Ciba-Geigy and it’s strong with  
great flow and transparency.”*

*“I’ll give it a try then. Do they do it  
in those little bags with the  
perforations?”*



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Irgalite Yellow BTN CI Pigment Yellow 12  
We’ve got it off to a ‘T’**

Pigments Division, Ciba-Geigy Plastics & Additives Company,  
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Vol. 63 No. 8 August 1980



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# Copolymers of polystyrene glycol and glyceryl phthalate resins in surface coatings

By S. Chandra and S. Pasari

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## Summary

Polystyrene glycol was prepared by a free radical bulk polymerisation technique. In the preparation of the alkyd, glycerol was partially replaced by polystyrene glycol during esterification reactions with phthalic anhydride. A laboratory process is described for the preparation of copolymers of nigerseed and castor oil alkyds having 13 to 24 per cent and 11

to 20 per cent polystyrene glycol respectively. This is a novel approach for the preparation of styrenated alkyds without the aid of conjugated fatty acids or oils. Copolymers were evaluated and their film properties were examined. It was found that the clear films of the copolymers were faster drying and had better chemical resistance than that of conventional styrenated alkyds.

## Keywords

*Types and classes of coatings and allied products*

clear coating

*Properties, characteristics and conditions primarily associated with*

coatings during application  
drying rate

*materials in general*

flexibility  
adhesion

*dried or cured films*

scratch resistance  
water resistance  
acid resistance  
alkali resistance  
solvent resistance  
elasticity resistance

*Raw materials for coatings binders (resins, etc.)*

polystyrene resin  
rosin  
rosin adduct

## Les possibilités en revêtements de surface des polymères à base du glycol de polystyrène et des résines glycéro-phthaliques

### Résumé

On a préparé le glycol de polystyrène par la technique de polymérisation en masse à l'aide des radicaux libres. Dans la préparation de la résine alkyde, le glycérol était remplacé en partie, au cours des réactions d'esterification avec l'anhydride phthalique, par le glycol de polystyrène. On décrit un procédé laboratoire pour la préparation des copolymères des résines alkydes à base des huiles de niger et de ricin ayant respectivement de 13 à 24 et de 11 à 20 pour cent de glycol de

polystyrène. C'est un nouveau abord à la préparation des alkydes styrénées sans l'intervention des huiles ou des acides gras conjugués. Les copolymères ont été évalués et les caractéristiques de leurs films ont été étudiées. On a trouvé que les films des copolymères séchaient plus rapidement et possédaient une meilleure résistance aux produits chimiques que ceux des alkydes styrénées conventionnelles.

## Die Mischpolymerisate von Polystyrolglykol und Phthalatharzen in Beschichtungsmitteln

### Zusammenfassung

Polystyrolglykol wurde mittels einer freies Radikal induzierten Mischpolymerisationstechnik hergestellt. Bei der Herstellung des Alkydharzes wurde das Glycerin, während der Esterifizierungsreaktion mit Phthalsäureanhydrid, von dem Polystyrolglykol teilweise ersetzt. Ein Laboratoriumsverfahren wird beschrieben zur Herstellung der Mischpolymerisate von Niger- und Ricin-öl modifizierten Alkydharzen, die 13 bis 24, und 11 bis 20 pro zent Polystyrolglykol, bzw. erhalten. Dies ist

eine neue Methode zur Herstellung von styrolisierten Alkydharzen, die keine Benutzung der conjugierten Öle oder Fettsäuren braucht. Die Mischpolymerisate wurden bewertet und die Eigenschaften ihrer Filme untersucht. Es wurde gefunden dass die klaren Mischpolymerisatfilme trockneten schneller und hatten bessere Chemikalienbeständigkeit als bei konventionellen styrolisierten Alkydharzen.

## Introduction

Refs. 1-19

Polystyrene, a polyolefin<sup>1</sup>, exhibits many useful properties such as water and chemical resistance<sup>2</sup>. Its incorporation into various resins especially the alkyds has been examined. Polystyrene homopolymer, as such, is not com-

patible with alkyds and, therefore, cannot be incorporated into alkyds simply by blending. Styrenated alkyds<sup>3</sup> are prepared by copolymerising styrene monomer and unsaturated fatty acids before or after the formation of the glyceryl phthalate resin, known as pre<sup>4,5</sup> - and post<sup>6</sup> - styrenation respectively. These methods require the presence of conjugation in fatty acids to enable the styrene to react by Diels-Alder reaction<sup>7</sup>. In this paper, a novel

method for the preparation of styrenated alkyd without the aid of conjugated fatty acids is described; the principle of this method consists of the synthesis of functional polystyrene which takes part in a condensation reaction during the preparation of alkyd resin.

Several functional groups have been introduced into the polystyrene chain, e.g. chloro<sup>8</sup>, sulfo<sup>9</sup>, hydroxy<sup>10</sup>, amino<sup>11</sup>, carboxyl<sup>12-14</sup> etc. In the present study hydroxyl group terminated polystyrene (referred to as polystyrene glycol<sup>10</sup>) has been synthesised and used in the copolymerisation reaction. The reaction of polystyrene glycol with phthalic anhydride<sup>10</sup>, fatty acids<sup>15</sup> and rosin<sup>16</sup> have been examined. It was also found that polystyrene glycol could be successfully blended<sup>17,18</sup> with alkyds. Copolymers of polystyrene glycol and linseed oil modified glyceryl phthalate resins have already been studied and reported earlier<sup>19</sup>. In the present work, copolymers of polystyrene glycol with nigerseed and castor oil modified glyceryl phthalate resins have been studied. Film properties of these copolymers have been evaluated and compared with those of conventional styrenated alkyd.

## Experimental

### Materials

Refs. 10,20

Phthalic anhydride and glycerol (both BDH, LR grade) and alkali refined nigerseed and castor oils were used in the preparation of oil modified glyceryl phthalate resins. Polystyrene glycol was prepared by free radical polymerisation of styrene using benzoyl peroxide as initiator and subsequent hydrolysis of the benzoate end groups<sup>10</sup>. The sample had a hydroxyl value of 39.8. Monomeric dehydrated castor oil (DCO) having an acid value of 6 and viscosity of 2 poise was used together with nigerseed oil for the preparation of a conventional styrenated alkyd<sup>20</sup>. Urea-formaldehyde (37 per cent) and n-butanol (all LR grade) were used in the preparation of butylated urea-formaldehyde resin added for cross linking with the alkyds. Benzene, xylene, methanol and butanol (LR grade) were used as solvents.

### Preparation of copolymers

Ref. 18

Copolymer samples containing polystyrene glycol were prepared using nigerseed oil and castor oil separately. The quantities of polystyrene glycol used for the synthesis of the copolymers were based on the maximum amount of polystyrene glycol found to be compatible in the blends as reported earlier<sup>18</sup>. The maximum amount of polystyrene glycol compatible with alkyds during the synthesis of copolymers was also determined. The amount of ingredients used for each sample is shown in Table 1.

### Nigerseed oil alkyd copolymers

Three samples of copolymers with nigerseed oil (without the presence of DCO) containing 13, 20 and 24 per cent polystyrene glycol were prepared. Nigerseed oil and glycerol were placed in a three necked flask fitted with stirrer, thermometer and Dean and Stark water separator. The mixture was heated to 180°C. Calcium oxide (0.2 per cent by weight of oil) was added and the temperature was raised to 230°C. Monoglyceride formation was checked by dissolving one part of the sample in three parts of methanol. When the monoglyceride had formed, the mixture was cooled to 180°C and phthalic anhydride and polystyrene glycol were added. The temperature was again raised to 230°C and kept there for about 6 hours. The

acid value of the final product was determined and is given in Table 1.

### Castor oil alkyd copolymers

Three samples of copolymers of polystyrene glycol and castor oil modified glyceryl phthalate resin containing 11, 17 and 20 per cent polystyrene glycol were prepared by heating mixtures of castor oil, glycerol, polystyrene glycol and phthalic anhydride directly at 230°C until an acid value of about 10 was obtained.

### Film curing

It was found that samples of the copolymers could not be cured by baking alone. Therefore, a sample of butylated urea-formaldehyde resin solution, containing 60 per cent solids, was prepared in the laboratory for mixing with the copolymers. Usually 25 per cent amino resin is mixed with alkyds, therefore, 25 per cent butylated urea-formaldehyde resin was added to all the samples of copolymers. In order to minimise the use of amino resin, samples containing 10 per cent butylated urea-formaldehyde resin were also prepared. Although the styrenated alkyd prepared from the mixture of nigerseed oil and dehydrated castor oil was air dried, amino resin was also mixed with it in order to maintain uniformity of composition necessary for comparative purposes.

### Characterisation and evaluation

In order to examine the usefulness of the copolymers of polystyrene glycol and oil modified glyceryl phthalate resins, their film properties were studied and compared with those of a conventional styrenated alkyd. For this purpose, all the samples were thinned with xylol to a brushable consistency. Films were applied onto 6 in. x 2 in. glass and tin panels. Films of styrenated alkyd and nigerseed alkyd copolymers were baked at 120°C for 40 minutes, whilst the films of castor oil alkyd copolymers were baked at 120°C for 50 minutes. All the baked films were hard, smooth and glossy.

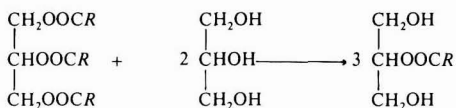
Films of all samples were tested for scratch hardness, flexibility and adhesion, and resistance towards water, acid, alkali and solvent.

## Results and Discussion

Refs. 10, 19

### Chemical structure of copolymers

The first step in the synthesis of the copolymers is the alcoholysis of oil to form monoglycerides:



oil

glycerol

monoglyceride

Monoglyceride together with polystyrene glycol and glycerol then react with phthalic anhydride yielding copolymer:

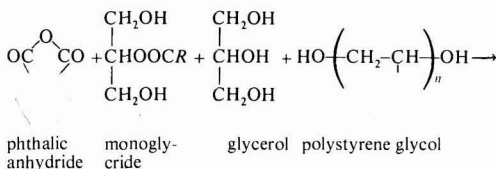
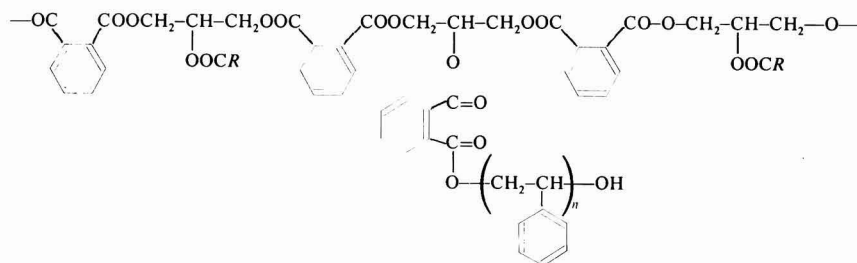


Table 1  
Composition and physical characteristics

Name of sample	Parts by weight				Polystyrene glycol	Percentage polystyrene glycol (calculated)	Acid value	Percentage amino resin mixed	Sample code	Scratch hardness g
	Oil	Phthalic anhydride	Glycerol	Styrene						
Styrenated alkyd	Nigerseed 30.0	+DCO +10.0	46.0	22.0	40.0	—	10	10 25	SU <sub>1</sub> SU <sub>2</sub>	3800 3800
Copolymer 1	Nigerseed 40.0		46.0	21.7	15.0	13	11	10 25	N <sub>1</sub> U <sub>1</sub> N <sub>1</sub> U <sub>2</sub>	3800 3850
Copolymer 2	Nigerseed 40.0		46.0	21.5	25.0	20	12	10 25	N <sub>2</sub> U <sub>1</sub> N <sub>2</sub> U <sub>2</sub>	4000 4100
Copolymer 3	Nigerseed 40.0		46.0	21.3	30.0	24	10	10 25	N <sub>3</sub> U <sub>1</sub> N <sub>3</sub> U <sub>2</sub>	4150 4200
Copolymer 4	Castor 35.0		50.0	23.7	12.0	11	10	10 25	C <sub>1</sub> U <sub>1</sub> C <sub>1</sub> U <sub>2</sub>	3800 3850
Copolymer 5	Castor 35.0		50.0	23.5	20.0	17	12	10 25	C <sub>2</sub> U <sub>1</sub> C <sub>2</sub> U <sub>2</sub>	3950 4000
Copolymer 6	Castor 35.0		50.0	23.4	25.0	20	12	10 25	C <sub>3</sub> U <sub>1</sub> C <sub>3</sub> U <sub>2</sub>	4100 4150



In fact, the polystyrene glycol<sup>10</sup> used is not exclusively a diol. It also contains a mono-ol group (a polystyrene chain with a hydroxyl group at one end and a phenyl at the other) and non-reactive polystyrene chains (with a phenyl group at both the ends). The mono-ol will also take part in the esterification, yielding a copolymer. The non-reactive polystyrene homopolymer is, however, found to be compatible with the copolymer and does not affect the quality of the product.

A big advantage of this process is that the presence of conjugation in the oil or fatty acid is not necessary. Here, polystyrene glycol easily reacts with phthalic anhydride and becomes a part of the glyceryl phthalate resin.

The copolymers formed might correctly be called graft copolymer because one polymer (glyceryl phthalate) has been synthesised in the presence of pre-synthesised polystyrene glycol. From the chemical structure shown above, glyceryl phthalate resin may be regarded as the backbone with polystyrene as the side chains.

### Flexibility and adhesion

Flexibility and adhesion was tested on tin panels by bending over a quarter inch mandrel. All samples showed good flexibility, i.e. no detachment of the film from the substrate or visible cracking was observed in any of the samples. Flexibility of the copolymers should be better than that of plain alkyd and styrenated alkyd because, in the copolymers, there would be less crosslinking due to the lower functionality of the polystyrene glycol compared to that of glycerol.

### Scratch hardness

Scratch hardness of the dried film was measured on tin panels with a mechanically operated "Sheen" scratch hardness tester by placing increasing loads over a hardened needle which moves across the film. The scratch hardness (in grams) of all samples is given in Table 1. From this table, it is clear that copolymers have better scratch hardness than that of conventional styrenated

alkyd. Further, it was also found that scratch hardness increased with increasing amounts of polystyrene glycol in the copolymer. This is due to the increased number of benzenoid rings present which impart greater hardness. It was also observed that samples of copolymer having 25 per cent amino resin showed better scratch hardness than the same sample with 10 per cent amino resin.

#### Water resistance

The sides of the glass panels were protected by wax before performing this test. The panels were immersed in distilled water at room temperature (25°C). The dipped portion of the film was examined for appearance, i.e. loss of gloss, change in colour and any other visible damage at regular intervals of five days. The results are given in Table 2. It was observed that after 45 days of immersion, the copolymer of nigerseed oil alkyd with 24 per cent polystyrene glycol showed slight loss of gloss; that with 20 per cent polystyrene glycol showed loss of gloss and change in colour. The copolymer with 13 per cent polystyrene glycol and 10 per cent amino resin showed partial removal of the film whilst the same copolymer with 25 per cent amino resin showed cracks.

In the case of copolymers of castor oil alkyds, slight loss of gloss was observed in copolymer samples with 17 and 20 per cent polystyrene glycol. Samples with 11 per cent polystyrene glycol and 10 per cent amino resin showed partial cracking whilst samples with 25 per cent amino resin showed only loss of gloss and change in colour. The film of styrenated alkyd was, however, completely removed. These results suggest that:

- (i) The reaction of polystyrene glycol, glycerol, oil and phthalic anhydride yields a copolymer which has better water resistance than that of styrenated alkyd synthesised by copolymerising styrene with fatty acids.
- (ii) Copolymers of castor oil alkyds have better water resistance than copolymers of nigerseed oil alkyds.

- (iii) Water resistance of copolymers improves with increasing polystyrene glycol content.
- (iv) Copolymers containing 25 per cent amino resin have better water resistance than those containing 10 per cent amino resin.

#### Acid resistance

For this test glass panels coated with the samples were immersed in 2 per cent solutions of hydrochloric, sulfuric and nitric acids separately at room temperature (25°C). Panels were checked for any loss of gloss, change in colour and for any sign of disintegration at regular intervals of 5 days. Table 2 gives the acid resistance of all the samples. It is clear that the acid resistance of copolymers with polystyrene glycol was excellent and far superior to that of styrenated alkyd. Further, acid resistance increases with increasing polystyrene glycol content in the copolymer samples. Copolymers of castor oil alkyds showed better acid resistance than copolymers of nigerseed oil alkyds. Samples containing 10 per cent amino resin have better acid resistance than those containing 25 per cent amino resin. The effect of nitric acid was more pronounced than that of hydrochloric and sulfuric acids.

#### Alkali resistance

Glass panels coated with the samples were prepared as described above and were immersed in a 2 per cent solution each of, sodium carbonate and sodium hydroxide separately at room temperature (25°C). Panels dipped in sodium carbonate solution were taken out at regular intervals of 10 days, washed in fresh running water and examined for any visible damage. The panels in sodium hydroxide were checked after every 5 hours. Results are given in Table 2.

It was found that after 30 days of immersion in sodium carbonate, the copolymer of nigerseed oil alkyds with 24

Table 2  
Resistance of styrenated alkyd and copolymers to water, acid, alkali and solvent

Sample code	Condition of the film immersed in						
	H <sub>2</sub> O 45 days	2% HCl 45 days	2% H <sub>2</sub> SO <sub>4</sub> 60 days	2% HNO <sub>3</sub> 30 days	2% Na <sub>2</sub> CO <sub>3</sub> 30 days	2% NaOH 30 hours	Xylene 80 days
SU <sub>1</sub>	0	0	0	0	0	0	0
SU <sub>2</sub>	0	0	0	0	0	0	0
N <sub>1</sub> U <sub>1</sub>	1	3	2	2	2	3	5
N <sub>2</sub> U <sub>1</sub>	3	3	3	2	3	3	5
N <sub>3</sub> U <sub>1</sub>	4	4	4	3	4	4	5
N <sub>1</sub> U <sub>2</sub>	2	2	1	1	1	2	5
N <sub>2</sub> U <sub>2</sub>	3	3	3	2	3	2	5
N <sub>3</sub> U <sub>2</sub>	4	4	4	2	4	3	5
C <sub>1</sub> U <sub>1</sub>	2	3	2	2	1	0	5
C <sub>2</sub> U <sub>1</sub>	4	4	4	3	2	2	5
C <sub>3</sub> U <sub>1</sub>	4	4	4	3	2	3	5
C <sub>1</sub> U <sub>2</sub>	3	3	2	1	0	0	5
C <sub>2</sub> U <sub>2</sub>	4	4	3	3	1	2	5
C <sub>3</sub> U <sub>2</sub>	4	4	4	3	2	3	5

5 – Practically unaffected  
4 – Slight loss of gloss  
3 – Loss of gloss and change in colour

2 – Partially cracked  
1 – Cracked and partially removed  
0 – Completely removed

per cent polystyrene glycol showed slight loss of gloss, that with 20 per cent polystyrene glycol showed loss of gloss and change in colour. Films of copolymer with 13 per cent polystyrene glycol (with 10 per cent amino resin) showed cracks and the same samples with 25 per cent amino resin showed partial removal of the film.

In the case of copolymers of castor oil alkyds partial cracks were observed in the films containing 20 per cent polystyrene glycol and 17 per cent polystyrene glycol (with 10 per cent amino resin). Films of the sample with 11 per cent polystyrene glycol (with 10 per cent amino resin) and the sample with 17 per cent polystyrene glycol (with 25 per cent amino resin) were partially removed. Films of the sample with 11 per cent polystyrene glycol (with 25 per cent amino resin) were, however, completely removed.

The results of immersion in 2 per cent sodium hydroxide also reveal that copolymers of nigerseed oil alkyds have better alkali resistance than copolymers of castor oil alkyds, and alkali resistance increases with increasing amounts of polystyrene glycol and decreases with increasing amounts of amino resins in the copolymer.

#### Solvent resistance

Glass panels prepared as mentioned earlier were dipped in xylene at room temperature (25°C). The condition of the films was observed at regular intervals of 10 days. The panels were removed, allowed to stand in a vertical position for 5 minutes and then rubbed with cotton wool soaked in xylene.

It was observed that the films of samples with polystyrene glycol were practically unaffected after up to 80 days of immersion, whereas the film of styrenated alkyd was completely removed in 15 days. It was interesting to note that polystyrene glycol, having a linear chain and being soluble in xylene was not affected by xylene. In the copolymers prepared, polystyrene glycol reacts chemically with phthalic anhydride and is incorporated into the compact structure of the glyceryl phthalate resin. In the case of styrenated alkyd, homopolymerisation of styrene cannot be avoided, therefore, little styrene is copolymerised with the fatty acids. The polystyrene homopolymer is sensitive to xylene, whereas in the preparation of copolymers from polystyrene glycol, the formation of polystyrene homopolymer is negligible and hence, the copolymer possesses excellent solvent resistance. Further, the baked films, show excellent solvent resistance even greater than that observed in the linseed oil copolymers<sup>19</sup>.

#### Conclusions

Polystyrene glycol, used to replace glycerol during the preparation of alkyds, provides a new approach to the synthesis of alkyds with a polystyrene content.

The polystyrene glycol serves a two-fold function, firstly, it can replace part of the glycerol used in the preparation of alkyds and, secondly, a chain of polystyrene can be incorporated into the alkyd. The product obtained has better physical and chemical resistances than those of conventional styrenated alkyds. It can be suggested that the products may find an application in high class finishes.

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#### References

1. Faucher, J. A. and Redig, F. P., "Crystalline olefin polymers, Part I", ed. Raff, R. A. V. and Doak, K. W., High Polymers series Vol. 20, *John Wiley and Sons*, 1965, ch. 13, 685.
2. Saunders, K. J., "Organic Polymer Chemistry", *Chapman and Hall*, 1973, London, 75.
3. Payne, H. F., "Organic Coating Technology", Vol. I, *John Wiley*, 1964, New York, 304.
4. Bhow, N. R. and Payne, H. F., *Ind. Eng. Chem.*, 1950, **42**, 700.
5. Menon, M. C. and Aggarwal, J. S., *J. Scient. Ind. Res.*, 1962, **21A** (3), 136.
6. Saunders, K. J., "Organic Polymer Chemistry", 1st ed., *Chapman and Hall*, 1973, London, 234.
7. Redknapp, E. F., *JOCCA*, 1960, **43**, 260.
8. Pasari, S. and Chandra, S., *Pop. Plast.*, 1979, **24**(1), 15, Cf. CA, 1979, **91**, 91979u.
9. Pasari, S. and Chandra, S., *J. Scient. Ind. Res.*, 1979, **38** (8), 424.
10. Pasari, S. and Chandra, S., *Indian Journal of Chemistry*, sec. B, 1980, **19B**(2), 147.
11. Wooding, N. S. and Higginson, W. C. E., *J. Chem. Soc.*, 1952, 1178.
12. Sorenson, W. R. and Campbell, T. W., "Preparative methods of Polymer Chemistry", *Interscience*, 1961, New York, 199.
13. Bamford, C. H. and Jenkins, A. D., *Nature*, 1955, **176**, 78.
14. Misra, G. S., Rastogi, R. C. and Gupta, V. P., *Makromol. Chem.*, 1961, **50**, 72.
15. Chandra, S. and Pasari, S., "Fatty acid esters of polystyrene glycol" paper presented at the 35th annual convocation of the *Oil Technologists Association of India*, held at Bombay (India) 16-17 Feb., 1980.
16. Chandra, S. and Pasari, S., *JOCCA*, 1980, **63**, 225.
17. Pasari, S. and Chandra, S., *Pig. Resin Tech.*, 1979, **8**(5), 12. Cf. CA, 1979, **91**, 93076w.
18. Pasari, S. and Chandra, S., *Pig. Resin Tech.*, 1979, **8**(6), 15. Cf. CA, 1979, **91**, 109062b.
19. Chandra, S. and Pasari, S., "Copolymers of polystyrene glycol and glyceryl phthalate resins in surface coatings". Paper presented at the International Symposium on "New frontiers in Polymer Science and Polymer Applications", held at Madras (India) 7-11 January, 1980.
20. Payne, H. F. "Organic Coating Technology", Vol. I, *John Wiley*, New York, 1964, 310.

# Deposition efficiency of powders in the electrostatic powder coating process

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## Summary

It has been observed that the deposition efficiency of powders applied by the electrostatic powder coating process varies from material to material. This is verified in laboratory experiments and an attempt has been made to correlate deposition efficiency with some of the physical properties of the material. No correla-

tion could be found with size, shape or electrical properties of the powder, but it was found that the surface density of charge and the tendency of a powder to back ionise were both important parameters.

## Keywords

*Types and classes of coatings and allied products*  
powder coating

*Raw materials for coatings*  
*binders (resins, etc.)*  
epoxy resin

*Processes and methods primarily associated with*  
*applications of coatings and allied products*

electrostatic coating  
deposition

## L'aptitude à se déposer des revêtements en poudre par le procédé de déposition électrostatique

### Résumé

On a noté que l'aptitude à se déposer des poudres lors de leur application par le procédé électrostatique, varie d'un poudre à l'autre. Cette observation a été vérifiée au moyens des expériences au laboratoire, et on a fait également une tentative d'établir une corrélation entre l'aptitude à se déposer et certaines

caractéristiques du produit. On n'a trouvé aucune corrélation entre la grandeur, la configuration ou les caractéristiques du poudre, mais on a trouvé que la densité de la charge superficielle et la susceptibilité du poudre d'être ionisé de nouveau étaient tous les deux des paramètres importants.

## Die Niederschlagsleistung der Pulver im elektrostatischen Pulverbeschichtungsverfahren

### Zusammenfassung

Es wurde betrachtet dass die Niederschlagsleistung der durch elektrostatische Pulverbeschichtung niedergeschlagenen Pulver sich dem Material gemäss verändert. Es wird mittels Laboratoriumsexperimente bewahrheitet und ein Versuch wird gemacht um die Niederschlagsleistung sich auf einigen der physikalischen Eigenschaften des Materials zu beziehen. Keine

Korrelation könnte zwischen der Grösse, der Form oder den elektrischen Eigenschaften des Pulvers gefunden werden, aber es wurde gefunden dass die Dichtigkeit der oberflächen Ladung als auch die Wiederionisierungsneigung des Pulvers wichtige Parameter waren.

## Introduction

Electrostatic powder coating is a process by which conducting objects can be painted by depositing charged dry powder onto the work-piece and fusing it to give a continuous paint layer. Industrial trials were carried out by a manufacturer who was installing a system in order to choose the best powder for the process. It was found that, although theoretically any insulating powder should deposit well, three commercial powders deposited with different efficiencies, namely A, 55 per cent, B, 38 per cent and C, 33 per cent. The best and worst powders were manufactured by the same company. All were white epoxy based materials with different curing agents. The aim of the experiments described below was to try to understand why deposition efficiencies differ and correlate this parameter with physical properties of the powder. The properties investigated were particle size, electrical resistance, dielectric constant, deposition current and charging efficiency.

## Test methods

*Ref. 1*

### Transfer efficiency

The industrial measurements of deposition efficiency were further confirmed in the laboratory. The maximum deposition efficiency was measured by coating a plate of a large enough area to intercept all the powder from the gun. The plate was weighed to find the amount of powder deposited in a given time and the deposition efficiency defined as the:

$$\frac{\text{weight of powder deposited in a given time}}{\text{total weight of powder emitted in the same time}}$$

The results shown in Figure 1 confirm the industrial results. There is a decrease in efficiency as the coating time increases, as has been observed previously<sup>1</sup>.

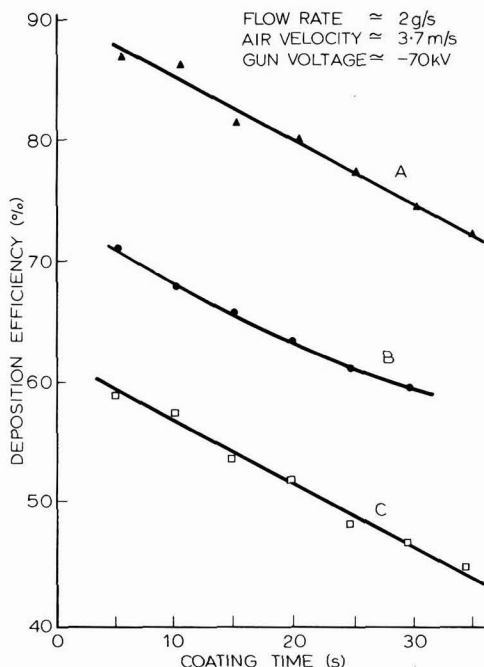


Figure 1. Deposition efficiency against coating time

**Particle size**

The size of the particles was observed qualitatively by microscope and quantitatively by Coulter Counter. Distributions are shown in Figure 2, A and C had similar broad distributions with 50 per cent by number having a size less than  $27\mu\text{m}$  and  $31\mu\text{m}$  respectively. Powder B was rather more peaked and had a slightly larger size with 50 per cent above  $35\mu\text{m}$ . The two powders with the narrowest size distribution had the most extreme efficiencies, i.e. the deposition efficiency could not be directly related to particle size.

**Electrical resistance and dielectric constant**

Electrical resistance and dielectric constant were measured in a standard resistivity cell containing two plane electrodes. In order to measure the resistance, 10 kV was applied and the current measured. The dielectric constant was measured by applying a low voltage 50 cycle AC signal and the capacitance measured on a bridge. These measurements are not absolute because it is difficult to be certain that packing is constant. However, by refilling the cell several times a reasonable comparison could be obtained between the powders. Within the limits of experimental variation, no difference in the dielectric constant

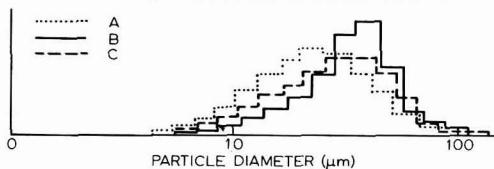


Figure 2. Size distribution of powders

Table 1

Powder	Resistivity $\times 10^{14} \Omega\text{m}$
A	7.9
B	9.8
C	7.2

Table 2

Powder	Mean radius $\mu\text{m}$	q/m	q/m $\times r$
A	14	7.0	98
B	18	6.0	108
C	14.5	6.1	88

could be detected. The resistivity measurements are shown in Table 1. Powder B was slightly, but consistently more resistive than A or C. Again this property does not correlate with deposition efficiency.

**Charging efficiency**

Refs. 2, 3

It is well known that charging is a statistical process in which the particles do not all reach their maximum theoretical charge<sup>2</sup>. A minimum charge of  $3 \times 10^{-4}\text{C/kg}$  is required for adhesion. Hence if the charging efficiency falls so that more of the powder fails to reach this charge level, the deposition efficiency will fall. The measurement of charging efficiency is not straightforward because the charged particles are mixed with free ions which must be eliminated before the measurement is made. Powder and ions were sprayed into a Faraday Can as illustrated in Figure 3. The inner can was connected to a charge meter and the outer was earthed as a screen. An earthed grid across the entrance intercepted the ions but allowed the powder (which had a much lower mobility) to pass through. The operation of the device has been described previously<sup>3</sup>. Some powder was intercepted by the grid and this coated the wires and went into back ionisation as will be described later. The back ion current discharged the oncoming powder so that the measurement of charging efficiency had to be made within a very short time before back ionisation began. The time available before the inception of back ionisation was a function of voltage as shown in Figure 4. The charge to mass ratios found are given in Table 2. Although the highest charging efficiency was obtained for the powder which deposited best, the other two were the same, within the limits of experimental error. It should be noted, however, that as charge is theoretically a function of surface area and mass to the volume, the charge to mass ratio must be multiplied by the mean radius to give an estimate of the surface charge density on the powder. This measurement is also shown in Table 2. It can be seen that deposition characteristics of the powders were not directly related to their ability to charge.

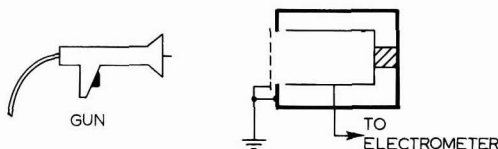


Figure 3. Faraday Can

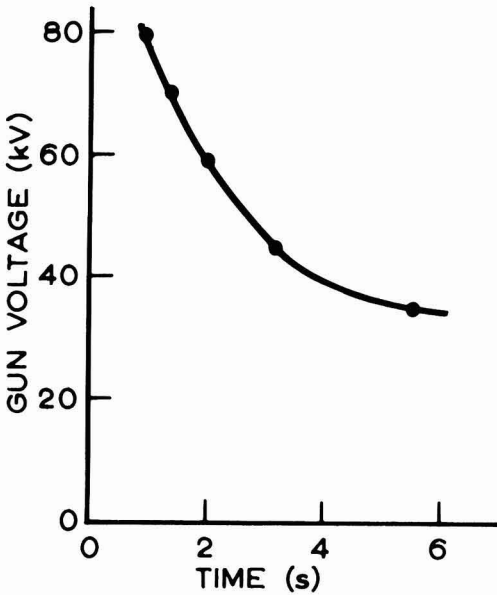


Figure 4. Onset of back ionisation as a function of gun voltage

#### Work-piece current

The work-piece current was monitored during coating trials because it gives a good indication of fluctuations in powder flow rate. A typical current form is shown in Figure 5. The ion current in the absence of powder is a constant steady level. When the powder was introduced the current fell as the powder travels much more slowly to the work-piece than do the free ions. There was a rise in current as back ionisation took place which eventually levelled off to a constant value. Increases in powder flow rate were shown by a decrease in current. The work-piece current for the three powders, deposited at a flow rate of 2 g/s, are shown in Figure 6. Although the powders differ only slightly in the amount by which the current falls, there was a large difference in the rise in current indicating much greater back ionisation from powder C than powder A.

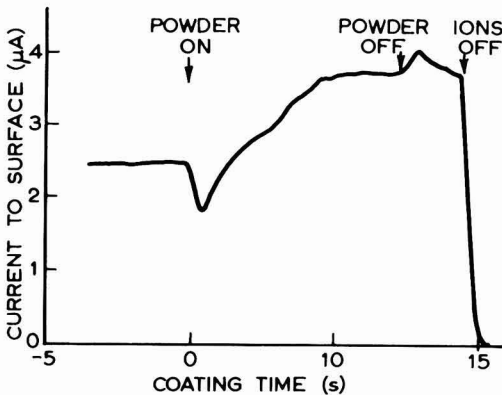


Figure 5. Plate current during coating

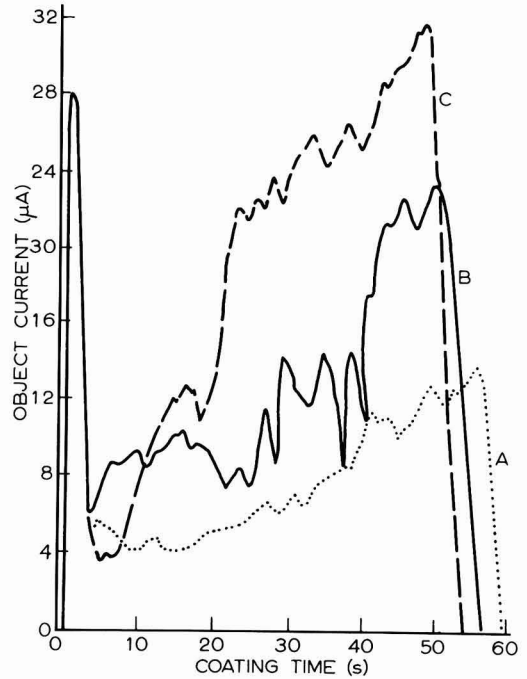


Figure 6. Object current as a function of coating time for the three powders

#### Back ionisation

Ref. 4

The phenomenon of back ionisation has been described fully in a previous publication<sup>4</sup>. Briefly, the high current from the gun flowing through the resistive powder layer builds up a very high electric field. The air trapped in the powder layer is thus so highly stressed that it breaks down into positive and negative ions. Positive ions are attracted to the negative spray gun and negative ions flow to the work-piece. Since the newly created ions are oppositely charged and move in opposite directions both components add to the work-piece current. The positive ions leaving the work-piece form a stream of "back" ions oppositely charged to the powder and which tend to discharge it. This accounts for the decreased efficiency with deposition time observed in Figure 1. This effect is illustrated more clearly

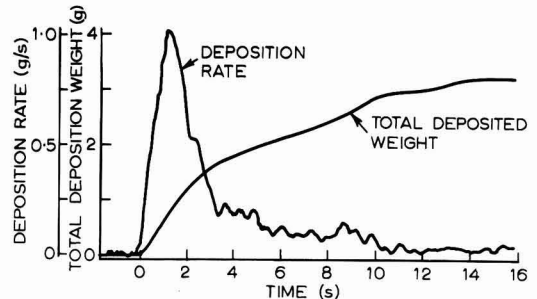


Figure 7. Deposition rate and total deposited weight as a function of time



by a graph which shows the rate of deposition as a function of time, Figure 7. The results clearly show that (for the three powders tested) one reason for the poorer deposition efficiency could be the higher tendency of a powder to back ionise. However, it is still not clear what properties cause one powder to back ionise more than another. It might be expected that a more sharply pointed powder particle would back ionise more easily than a sphere but no differences in shape were obvious. The packing density might also be important but attempts to measure the packing of a deposited film have not so far been successful. Finally, the resistivities of the powder surfaces are also likely to be relevant. The present test method is not sufficiently sensitive and further work must be carried out on these aspects.

### Conclusions

The deposition efficiency of three different powders has been measured and attempts made to correlate this property with some physical parameters of the powder. No correlation has been detected with size or electrical properties but there is a correlation with the tendency of a powder to back ionise and this can certainly dominate the efficiency of deposition over typical coating times of 15

seconds. For short coating times, before back ionisation dominates, the surface density of charge on the powder which also varies between the powders will affect deposition efficiency.

These measurements reported above were carried out on industrial powders being proposed for a particular product. Ideally this sort of work should be repeated and extended with less complicated products in which one parameter can be varied at a time. Relevant parameters to be investigated should include packing density, shape, and surface discharge characteristics as well as the chemical nature of the surface.

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### References

1. Cross, J., Bassett, J., *Trans. Inst. Metal Fin.*, 1974, **52**, 112.
2. Lacchia Ph D Thesis Grenoble University, 1976.
3. Sampuran Singh Institute of Electrical and Electronic Engineers, Industrial Application Society Annual Meeting 1979, Cleveland, USA, 196-199.
4. Cross, J., Corbett, R. P., Bassett, J., *Proc. Inst. Physics*, 1975 Conference Series Ch. 3, No. 27.

# Solving air pollution problems in the manufacture and use of surface coatings\*

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## Summary

Air pollution problems can arise at any stage in the life of a surface coating. During paint manufacture, solvent vapour or pigment dust are liable to be released into the factory atmosphere whilst resin manufacture can liberate odorous degradation products.

Some methods of application, such as dip coating, may give rise to significant concentrations of solvent vapour in the atmosphere whilst spray application reduces the entire coating to a form which can be inhaled.

The stoving of industrial paints can give rise to problems since many resin degradation products are highly odorous and may

cause offence to residents living near the factory premises.

Another possible source of pollution is the removal of coatings during the fabrication, refinishing or destruction of painted articles and structures. Operations such as abrasion, welding and flame cutting can all result in pigments, binders or their degradation products being dispersed in the atmosphere.

The first stage in solving the sort of air pollution problems described above is to determine the nature and concentration of the pollutants in the atmosphere. This information can then be used to decide which is the best abatement method to use.

## Keywords

*Processes and methods primarily associated with analysis, measurement or testing*

pollution control  
air pollution control

*drying or curing of coatings*

pollution control  
air pollution control

*Specifications, standards and regulations*

pollution control regulations

*Miscellaneous terms*

pollution

## La résolution des problèmes de pollution atmosphérique provoqués par la fabrication et l'utilisation de revêtements de surface

### Résumé

Les problèmes à l'égard de la pollution atmosphérique peuvent se produire à chaque stade de la vie d'un revêtement de surface. Pendant la fabrication de peinture, la vapeur de solvant ou la poussière de pigment est susceptible d'être dégagée à l'atmosphère de la fabrique, tandis que des produits de dégradation malodorants peuvent être libérés lors de la fabrication de résines.

Certaines méthodes d'application, telles que trempage, peuvent produire dans l'atmosphère des concentrations importantes de la vapeur de solvants, tandis que le pistolage présente la peinture sous une forme susceptible d'être inhalée en totalité.

L'étuvage des peintures industrielles peut soulever des problèmes, puisque plusieurs produits de dégradation des résines ont une odeur fortement marquée, qui peut donner offence à ceux qui résident en proximité de l'usine.

Une autre source de pollution éventuelle est créée lors de l'enlèvement des revêtements pendant la fabrication, le repeinture, la destruction des objets ou des structures peints. Les opérations telles que le sablage, le soudage ou le coupage à la flamme peuvent tous aboutir au dégagement à l'atmosphère de pigments, liants ou produits de leur dégradation.

La première étape de la résolution des problèmes de pollution atmosphérique, tels que l'on décrit au dessus, est la détermination de la nature et de la concentration atmosphérique des polluants. Ces données peuvent être utilisées alors afin de décider la meilleure méthode pour diminuer l'inconvénient. Au cours de ce discours le rôle de la Paint R.A. dans le domaine de l'analyse et la diminution des polluants sera traité en détail.

## Das Lösen der Luftverschmutzungsprobleme, die von der Beschichtungsmittel - Herstellung und - Benutzung erzeugt werden

### Zusammenfassung

Die Luftverschmutzungsprobleme können zu irgendeiner Stufe im Leben einer Beschichtung vorkommen. Während der Herstellung von Anstrichstoffen lassen sich Lösungsmitteldampf und Pigmentstaube in die Fabriksatmosphäre entlassen, und die Herstellung von Harzen kann doch übelriechende Abbauprodukte auslösen.

Einige Auftragsmethoden wie Tauchverfahren können in die Atmosphäre wichtige Konzentrationen von Lösungsmitteldampf hervorbringen, während das Spritzverfahren in eine einatembare Form das ganze Beschichtungsmittel verwandelt.

Die Ofenhärtung von industriellen Anstrichstoffen können

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probleme machen, denn viele Abbauprodukte der Harze sind doch überreichende, und deshalb Ärgeris für die Einwohner in der Betriebsumgebung erregen.

Ein andere eventuelle Verschmutzungsquell befindet sich in der Wegnahme von Beschichtungen während der Herstellung, des Wiederanstreichens, oder der Vernichtung der angestrichenen Artikel und Strukturen. Die Verfahren wie Sandstrahlen, Schweißen und Schneidbrennen können alle zur Folge haben dass Pigmenten, Bindermittel oder ihre Abbauprodukte in die Atmosphäre zerstreuen werden.

## Introduction

*Refs, 1, 2*

Prior to 1974, UK air pollution regulations were concerned with problems such as the emission of combustion products, smoke and a limited number of hazardous materials arising from certain specified industries.

The situation was dramatically changed by the enactment of the Health and Safety at Work Act 1974<sup>1</sup> which placed well defined and wide ranging responsibilities upon all persons in industry. One of the aims of the Act was the control of emission into the atmosphere of noxious or offensive substances and the Act imposed a duty on management to render any such emissions harmless and inoffensive.

The main reason why this Act has proved so effective is that it not only lists a number of desirable objectives, but it also defines very precisely what persons are responsible for ensuring that they are attained. For example, in the paint industry the raw material supplier must provide the paint manufacturer with information on the hazardous nature of the materials he supplies, whilst the paint manufacturer in turn must advise the paint user on any precautions that should be taken in order that the paint can be used safely. The paint user is responsible for ensuring that any safety precautions are observed and the workforce are obliged to obey any safety regulations and use any protective equipment supplied. In this way responsibility is first placed upon a particular organisation then devolves upon identifiable employees. The Act specifically allows for the prosecution and punishment of individuals as well as corporate bodies; a feature which can only serve to make all employees more aware of the importance of maintaining a safe working environment.

In order to be effective, any environmental pollution legislation must define the maximum acceptable concentrations of airborne pollutants. There are numerous materials which can contaminate industrial atmospheres and their irritant, toxic and carcinogenic properties differ widely. The hazard depends not only upon the atmospheric concentration of a given pollutant but also on the frequency and duration of exposure and, in some cases, the physical state of the pollutant. Ideally, the legislation would define maximum atmospheric concentrations of a large number of air pollutants under a variety of exposure conditions. Information of this type is published annually by, amongst others, the American Conference of Governmental Industrial Hygienists (ACGIH) who list Threshold Limit Values (TLVs) for substances in the working atmosphere. The ACGIH values are generally adopted by the UK Health and Safety Executive without any modification although there are a few instances where the British recommend different limits<sup>2</sup>.

Das erste Stadium in das Lösen der solchen Luftverschmutzungs probleme, die hier beschrieben sind, besteht aus der Bestimmung der Natur und Atmosphärenkonzentration der Verschmutzungsmittel. Dann kann man dieser Kenntnis benutzen um die beste Verminderungsmethode zu wählen. Die Arbeit der Paint R.A. im Bereich der Analyse und der Verminderung von Verschmutzungsmitteln wird in der Vorlesung genau dargestellt.

## Methods of sampling and analysis

*Refs, 3-6*

The analysis of air pollutants is most often carried out in order to establish if the concentrations in the atmosphere are below the recommended maximum. The information obtained can, however, be of value in deciding which abatement method is likely to be the most successful.

When sampling to test compliance with a TLV, the question arises whether to take samples from the general working environment or from the breathing zone of particular workers. Breathing zone samples are clearly preferable from the point of view of obtaining accurate information on the quality of pollutants inhaled by a particular worker. The sampling method does, however, have limitations since the equipment used has to be sufficiently robust and portable to be worn by workers. In cases where a large number of employees are at risk it is necessary to form breathing zone samples from enough people for the results to be statistically significant; this necessitates the expense of multiple analyses as well as duplication of the sampling equipment.

Background sampling can yield useful information on pollutant levels in the working environment, providing the sampling sites are chosen with care. It is good practice to sample in regions where the workers are most likely to be found, as well as in selected areas of both high and low pollutant concentrations; always provided that these can be considered as part of the workers' environment.

Atmospheric pollutants can be conveniently divided into two classes, gaseous and particulate. In practice, the division is not clear-cut since some gaseous materials may condense to form particulates when coming into contact with cooler air, whilst some particulates will have a finite vapour pressure at ambient temperature. Borderline cases such as these provide the greatest challenge to the analyst.

The method chosen to measure the concentration of gaseous materials in the atmosphere depends on the complexity of the mixture to be analysed and also on the amount of qualitative information which is required. If only one component is present it may well be possible to carry out the determination using a specific indicator tube of the type marketed by Draeger. A measured volume of air is drawn through a glass tube packed with a reagent coated adsorbent which changes colour in the presence of the gaseous pollutant in question. The length of the indicating layer which changes colour or the volume of air required to produce a given colour change can then be taken as a measure of the pollutant concentration. The tubes are commonly used with a hand-operated pump to take short term background samples, although long-term tubes are available which, in conjunction with a battery operated pump, can monitor breathing zone concentrations over an eight-hour period.

The use of specific indicator tubes enables an analytical result to be obtained immediately after the air sample has been taken. The method is cheap, reasonably accurate and simple enough to be used by relatively unskilled persons. Its main disadvantage is the lack of discrimination of some of the reactants.

Care should also be taken when using the tubes to sample air containing significant amounts of particulate material, since this may partially block the tube and reduce the airflow rate. This is especially the case when battery operated pumps are used as some models cannot be relied upon to record accurately the volume of air drawn through a tube unless the airflow resistance remains constant.

The UK Health and Safety Executive have published a number of booklets describing methods of determining low concentrations of selected atmospheric pollutants, both gaseous and particulate. In general, these are more suitable for background sampling work since the equipment involved tends to be too cumbersome and fragile to be worn by workers (Figure 1).

Infrared gas analysis is another example of an analytical technique more suited to background sampling. The equipment, although robust and transportable, is not designed to be worn by workers. In the Miran<sup>3</sup> infrared gas analyser, the instrument pump is used to draw the air to be sampled through a variable path length gas cell fitted to a single beam infrared spectrometer, which is tuned to a wavelength corresponding to a strong band in the spectrum of the pollutant to be monitored. A calibration graph is then used to convert absorption readings to atmospheric pollutant concentrations.

The equipment can be used to monitor mixtures of solvent vapours provided a strong absorbance band can be found, for each component, which is not subject to interference by the spectra of the other components in the mixture. In practice, this means that it is not easy to use infrared gas analysis for mixtures containing more than four or five components.

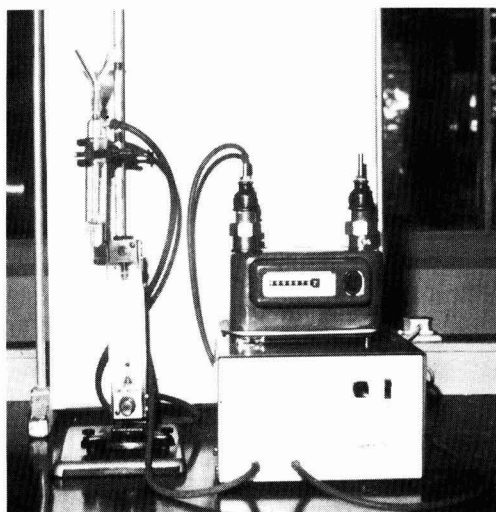


Figure 1. A midjet impinger connected to a flow meter, an air pump and a gas volume recorder

The determination of complex solvent vapour mixtures requires prior separation of the components by gas-liquid chromatography. Air samples can be collected using either air-bags and pumps or evacuated rigid containers but, in practice it is more satisfactory to draw the polluted air through a tube packed with a suitable adsorbent material. The volatiles can then be desorbed from the packing either by heating the tube or by extracting with solvent.

Thermal desorption techniques can be used for many of the volatiles used in surface coatings, but problems can arise when sampling either very volatile or very involatile materials. Low boiling solvents, such as methylene chloride, acetone or hexane may not be retained quantitatively by the tube packing unless a low sampling rate is used, whilst the problem with high boiling materials is not in collecting the materials, but in desorbing them quantitatively from the tube.

If active carbon is used as the adsorbent, it is possible to desorb the collected solvents using carbon disulphide. An aliquot of the desorbed sample solution is then injected into a gas-liquid chromatograph fitted with a flame ionisation detector. This method is of importance since it is the one approved by NIOSH for use by OSHA compliance officers when determining the concentration of airborne organic vapours<sup>4</sup>.

Breathing zone and background sampling can be carried out using either type of desorption tube although, like specific indicator tubes, they are liable to interference by airborne particulates. The solvent desorption method is less sensitive than thermal desorption, but it is the better method where the analyst wishes to obtain qualitative information.

It is possible to dispense with the sampling pump by enclosing the active carbon in a dosimeter with known diffusion characteristics. The dosimeter is designed to be worn on the collar during a working shift, after which the carbon element can be removed and analysed in the same way as the carbon from a desorption tube<sup>5</sup>.

Gas liquid chromatography is an excellent separation method but it is unsuitable for the qualitative analysis of substances for which it has not been calibrated. When the analyst wishes to identify the components in a complex mixture of pollutants, such as that formed when paints are stove or burned, it is generally necessary to couple the chromatographic technique with some other method designed to give structural information on the separated components.

The most effective technique for this purpose is mass spectrometry and there are a number of commercially available GLC/MS systems. The connection of a gas-liquid chromatograph (operating at several atmospheres overpressure) to a mass spectrometer (operating under high vacuum) requires an interface designed to separate the sample from the bulk of the GLC carrier gas before it is admitted to the mass spectrometer. Until recently, the whole system was designed around the mass spectrometer and the GLC interface was just one of a number of methods of introducing a sample into the spectrometer. The current approach is to think of GLC/MS as a technique requiring a specialised instrument designed around the chromatograph. The mass spectrometer is regarded as a versatile GLC detector and samples can be admitted to the spectrometer only via the chromatograph. An instrument of this type can be connected to a computer system which

controls the operational parameters and also records the mass spectral data in numerical and graphical form. The computer can also be used to store a library of mass spectra which can be compared with the spectra obtained from each component in the mixture to be analysed.

Mass spectrometry is undoubtedly the best method of identifying an unknown volatile pollutant since it gives information on the molecular weight and molecular structure of the material. It can also be used to obtain spectra of very small amounts of material admitted to the instrument in rapid succession and hence is ideally suited to the analysis of mixtures separated by GLC. The main disadvantage of the technique is the high cost of the equipment.

It is possible to connect an infrared gas cell to the outlet of a GLC column and to record the gas phase infrared spectra of the separated components of a mixture. This technique is considerably cheaper than GLC/MS, but it requires a larger sample and a longer time to run each spectrum (Figure 2).

It is known that the odours of some pollutants, notably amines and acrylic monomers, are detectable at atmospheric concentrations of one part in a thousand million. Since these materials are normally very minor components of the total pollutant mixture, it may not be possible to distinguish them as separate peaks in a gas-liquid chromatogram of the mixture. A useful technique in such circumstances is to carry out the analysis using a gas-liquid chromatograph fitted with an effluent splitter in order that the "odour" of the separated components can be noted. This enables the odorous components to be located even if no discrete peak is visible in the chromatogram. The character of the "odour", coupled with the retention time data, can be an aid in identifying the substance. Care should be taken to ensure that the effluent concentrations are well below the TLV of the most toxic materials likely to be present.

The analysis of particulate material in the atmosphere may, in some cases, only involve determining the particulate concentration in terms of weight of pollutants present in a given volume of atmosphere. A number of devices are available for this type of determination for both breathing zone and background sampling. All that is required is to pump air at a known rate through a pre-weighed filter which is then reweighed after the sample has been collected.

If the analyst is required to determine the toxic element content of the atmosphere, e.g. the concentration of lead or chromium, it is a relatively simple matter to extract material from the filter with a suitable acid mixture and then to determine the elements using a technique such as atomic absorption spectrometry.

In the case of silica-based materials, the crystalline state of the substance is of primary importance in assessing the health hazard caused by inhalation. The ideal analytical method in such cases is X-ray diffraction and this can, in fact, yield useful structural information on any crystalline particulate.

Another important parameter, from the viewpoint of health hazard, is particle size. It is well established that the human respiratory system functions as a size selective particle trap with the smaller particles penetrating deep into the lung, whilst the larger particles are retained in the nose or deposited in the upper respiratory tract<sup>6</sup>.



Figure 2. A Cira 101 Chromatographic Infrared Analyser mounted on a Beckman Acculab Spectrometer

It is possible to design sampling equipment which separates airborne particles on the basis of particle size. In the simplest form this involves a separation into "respirable" and "non-respirable" fractions, the cut off point often being taken as 7 microns. More elaborate equipment of the cascade impactor type is capable of separating the particles into a number of well defined size ranges.

#### Methods of abatement

The simplest cure for many atmospheric pollution problems is an efficient system of ventilation. However, this method only transfers the pollutants to a different area, it does not remove them from the atmosphere. Some pollution problems can be solved by changes in working methods or in materials used, e.g. the use of a different paint, a different method of application or a lower stoving temperature.

If, however, the industrial process cannot be changed significantly then a number of abatement methods may be considered.

Thermal and catalytic incineration are undoubtedly the most efficient methods of removing organic pollutants from an airstream. The main disadvantage of these techniques is the high installation and running cost. Adsorption using active carbon is a reasonably efficient abatement technique which is relatively cheap to install. The main disadvantage is the cost of replacing the carbon. It is technically possible to regenerate the carbon but, unless there is a market for the recovered material, regeneration is not normally economically viable.

If the problem can be shown to be one of odour nuisance, rather than of toxicity, then some deodorant method may be used. Odour masking or odour counteraction techniques, which involve spraying the fumes with selected deodorants, are very cheap to install but can be rather expensive to run. Since the counteractant is deliberately administered to the surrounding population it could be argued that more than usual care should be taken to ensure that it is completely harmless. Reaction to odour is very much an individual one and it is quite possible that some people would regard the smell of the deodorant as more objectionable than the smell of the fumes. One potential danger associated with the use of this technique is that it might impair the sense of smell thus hindering the detection of events such as gas leaks and solvent spillages.

Liquid scrubbing, using water as the scrubbing medium,

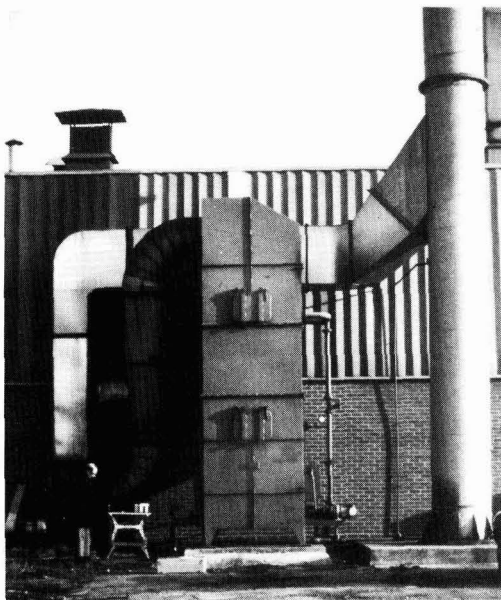


Figure 3. A commercial fume scrubber used to scrub the paint stoving effluent at a factory coating metal strips

is a relatively cheap abatement method in terms of installation and running costs and is applicable both to gaseous and particulate pollution problems. Its main disadvantage is that many organic pollutants are not water miscible, which means that the volatile materials pass straight through the equipment whilst the less volatile components tend to be deposited inside the scrubber thereby reducing its efficiency (Figure 3).

#### **Pollution problems in the manufacture of surface coatings**

*Ref. 7*

In 1977 the Paint RA carried out a comparative study of solvent vapour concentrations in the paint industry which involved visits to over 30 paint factories throughout Britain and Europe<sup>7</sup>.

Only three instances were recorded where the Threshold Limit Value of individual solvents was exceeded and even when the more exacting requirements of additive TLVs were applied only 11 samples were found where this value had been exceeded.

Nearly 80 per cent of the points monitored were found to be operating at less than 50 per cent of the maximum recommended solvent concentration. Manufacturers who only used hydrocarbon solvents were particularly free from pollution problems and rarely exceeded 20 per cent of the additive TLV.

It should be borne in mind when interpreting these results that the selection of monitoring points was biased towards those areas of the factories where the solvent vapour concentrations were judged to be at a maximum.

It was apparent from this study that, in some cases, the higher solvent vapour readings recorded were associated

with the heating of the products during the dispersion or dissolving stages of manufacture. A number of firms overcame this problem by the use of localised extraction systems which enabled flexible ducting to be positioned close to the heated vessels thus extracting the solvent vapour at source. Such a system is likely to be more economical than a general extraction system involving wall mounted fans because localised extraction should reduce the number of air changes required for safe working and, in consequence, reduce the factory heating bill and the cost of air circulation.

The other main pollution problem arising in surface coating manufacture is the release of pigment dust into the atmosphere. Lead and zinc chromates and cadmium pigments are examples of materials where special care is needed to ensure that atmospheric concentrations are maintained below the TLV. The most effective abatement methods are ventilation localised at pigment handling areas coupled with good working practice. The automatic cleaning up of accidental spillages and the careful transfer of the dry materials can do much to reduce the problem.

#### **Pollution problems in the application of surface coatings**

*Refs. 8-10*

Application methods such as brushing, dipping and roller coating result in pollution of the atmosphere by solvents. During spray application, however, the entire coating is reduced to a form which can be inhaled. Whatever method is used to apply an organic solvent based coating, it has to be accepted that it is the function of the solvent to evaporate and that, unless an abatement method is used, this inevitably gives rise to atmospheric pollution.

The magnitude of the problem depends on the quantity of paint used, the composition of the solvent and the method of application. Application by roller coating machines may cause problems because of the rapid rate at which paint can be applied, whilst the dip coating process, which involves exposure to the atmosphere of a large area of wet paint, can be especially troublesome. A properly designed ventilation system will do much to eliminate atmospheric pollution in the working area and it may be desirable, and indeed economically advantageous, to limit external atmospheric pollution by adsorbing the solvent vapour on active carbon.

Apart from conventional air atomising equipment there are a variety of atomising methods such as 'airless', 'mistless', 'warm air' and 'electrostatic' spraying.

If the coating contains toxic pigments then spray application is potentially hazardous. Certain binders and curing agents can also give rise to health problems and two-pack epoxies and polyurethanes can present special problems due to their allergic and sensitising action.

In 1977 the Paint RA carried out an investigation on behalf of the UK Health and Safety Executive into the hazards involved in the spraying of two-pack polyurethane paints using a number of different combinations of paints and spray guns<sup>8</sup>.

The study showed that the quantity and the droplet size distribution of paint overspray was dependent on both the physical properties of the paint and the type of spray gun used.

Some indication of the potential hazard involved in the spraying of two-pack polyurethanes in unventilated atmospheres was given when it was shown that, on average, a single five-second spray burst gave sufficient harmful overspray to exceed the safe atmospheric concentration in a room 50 cubic metres in volume. These measurements were made 30 minutes after spraying when over 90 per cent of the original overspray had settled out from the atmosphere.

Evidence was obtained suggesting that, in one paint overspray, droplet fragmentation occurred resulting in fragments which were more liable to be inhaled.

No relationship was apparent between droplet size and rate of reaction of the isocyanate adduct with atmospheric moisture. There was in fact no evidence of a significant reaction of the isocyanate adduct in the overspray during the 30 minutes following spraying.

Rate of curing measurements on thin films of the paints confirmed that the isocyanate adducts reacted rather more slowly with moisture than might have been expected bearing in mind the speed at which acceptable film properties were obtained. The results indicated that spray dust could still be potentially hazardous several days after spraying and it was recommended that persons engaged in either the cleaning or replacing of dry-backed spray booth filters, or in the rubbing down of freshly painted surfaces, should take the same precautions as persons spraying two-pack polyurethanes. The hazard due to dusts from two-pack polyurethanes is at present under investigation at the Paint RA.

The best way to ensure the safety of persons spraying paint is to carry out the operation in a spray booth under adequate airflow conditions. The wearing of dust masks, respirators or air-fed breathing masks is also desirable but it is important to ensure that this protective equipment is properly maintained, correctly fitted and habitually worn.

The problem of atmospheric pollution from the stoving of industrial paints is one of special interest at the Paint RA where, over the past six years, work has been carried out on the analysis and abatement of paint stoving effluent<sup>9,10</sup>. Analytical work showed that although the main components of the fumes were residual solvent, the most odorous portion originated from the thermal degradation of the binder. The concentrations of fume components collected on-site, both inside and outside factories, were always significantly below those regarded as injurious to health on prolonged exposure. The problem was, therefore, defined as one of nuisance and not of toxic hazard.

In some cases it may be possible to reduce the problem by using a different paint or, alternatively, an odour counteractant may be effective. The Paint RA research showed that the most effective and economical method was to scrub the fumes with a reagent selected in the laboratory on the basis of its ability to react selectively with the odorous fume components. Dilute aqueous solutions of acids, bases, oxidising agents or detergents were found to be effective for this purpose. Laboratory selected reagents were then tested on-site using a pilot plant scale scrubber (Figure 4). The results obtained on-site were in good agreement with those obtained in the laboratory. In situations where the odour of the reagent scrubbed fumes was still judged to be unacceptable, it was possible to pass them through an active carbon adsorption unit to effect a final clean-up.

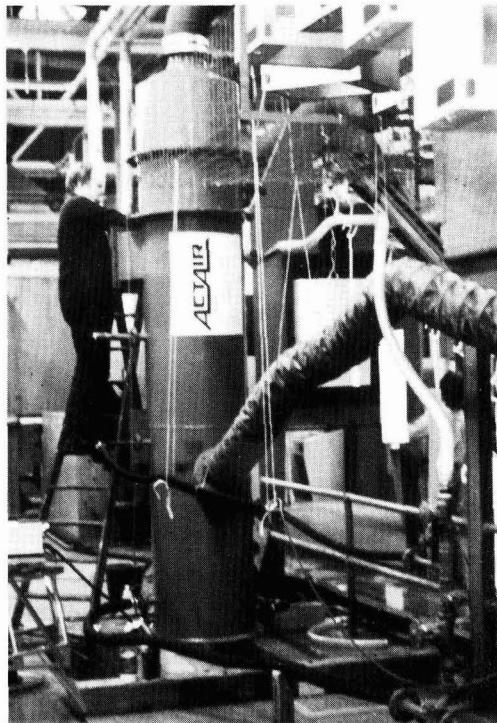


Figure 4. A pilot plant scale liquid scrubber used to scrub the paint stoving effluent at a domestic appliance factory

### Pollution problems in the removal of surface coatings

Ref. 11

The removal of surface coatings may result in pollution of the atmosphere by the material used to remove the coating, by the detached coating and by coating degradation products. The stripping of coatings from substrates with caustic liquids or organic solvents can give rise to the evolution of vapours and mists, whilst the use of abrasive removal methods may result in the release of particles of the coating together with any abrasive used.

Processes such as paint stripping with a blow torch, and the flame cutting or welding of painted metal can all give rise to volatilisation and degradation of the pigments and binders which comprise the coating. If the blow torch is used only to soften the paint, then the pollutants released into the atmosphere will be mainly binder degradation products similar to those formed when industrial paints are stoved. Welding over steel that is coated with blast primer results in the formation of a range of degradation products<sup>11,12</sup>: in the hottest regions the binder is totally destroyed and the pigment may be volatilised; in the cooler regions, several inches from the weld, the temperature and degradation products are those typical of paint stoving operations.

Flame cutting differs from welding in that it may be necessary to cut through metal which has been thickly coated with paint. This can be hazardous in some situations, e.g. the cutting of steel coated with many layers of

lead based paint in confined spaces such as tunnels and the inner recesses of ships.

Most of these pollution problems can be solved by a combination of effective ventilation and respiratory protection. It may be possible to reduce any hazard by avoiding the use of some materials, e.g. abrasives containing crystalline silica or blast primers based on polyurethanes.

#### Future trends

The ultimate solution to air pollution problems is to remove workers from the polluted areas and replace them by machines. The recent rapid developments in microprocessor technology means that it is now possible to construct machines which can carry out repetitive operations, such as paint spraying and welding in the automotive industry. The machines are first programmed by a skilled operative and are then capable of reproducing the working actions as often as required.

The first generation of these machines is limited by the fact that they cannot cope with non-routine occurrences, e.g. the slight differences in the orientation of car bodies on the paint shop conveyor. However, it is possible to envisage a machine which is equipped with sensors which feed back information to a machine control system that is capable of making appropriate variations to the standard programme of working actions. Such a machine would be capable not only of carrying out the work, but also of approving, rectifying or rejecting the finished articles.

The problem that these machines cannot solve is what to do with the workers whose jobs they replace. It is at this

point that the arguments for and against the new technology cease to be concerned solely with technical and economic matters.

[Received 14 March 1980]

#### References

1. Health and Safety at Work etc. Act 1974, ch. 37, *London: Her Majesty's Stationery Office*.
2. Health and Safety Executive, Guidance Note EH 15/78: Threshold Limit Values for 1978, *London: Her Majesty's Stationery Office*.
3. Supplied by *Foxboro/Wilks Inc.*, South Norwalk, Connecticut, USA.
4. NIOSH Manual of Analytical Methods, Method No. P & CAM 127, *HEW Publication No (NIOSH) 75-121*.
5. Supplied by *Abcor Inc.*, 850 Main Street, Wilmington, Maryland, USA.
6. Liu, B. Y. H., "Fine Particles", *Academic Press*, 1976, 287-310.
7. Falla, N. A. R. and Farnden, A. P. M., "An Interfirm Comparison of Air Pollution in Paint Factories", Technical Report No. TR/6/77, *Paint RA*.
8. Falla, N. A. R. and Glynn, F. B., "Determination of Iso-cyanates and Prepolymers in Working Atmospheres: Effect of Spraying Conditions", Research Contract No. A/C29/5 (Revised), *Paint RA*.
9. O'Neill, L. A., Falla, N. A. R. and Hume, J., "Analysis of Gaseous Products Evolved in the Stoving of Industrial Paints", Research Contract No. APC/2/73, *Paint RA*.
10. Falla, N. A. R., Farnden, A. P. M., Latham, M. M. and McAdam, J., "Abatement of Stoving Effluent", Research Contract No. APC/2/73X, *Paint RA*.
11. Bille, M., Rosendahl, C., Steen, A., Svensson, L. and Wallen, K., *Svetsaren (ESAB) 1976*, 2, 6.
12. Moreton, J. and Falla, N. A. R., "Analysis of Airborne Pollutants in Working Atmospheres: The Welding and Surface Coating Industries", Analytical Sciences Monograph No. 7, *The Chemical Society London*.



# New metal complex pigments

By A. M. Naser, A. A. Salman, I. M. Abd-Allah, M. A. Abd El-Ghafa and A. N. Khouzondar

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## Summary

Polycarboxylic acids were recently prepared by the condensation of dibasic acids with urea or urea derivatives under conditions which would avoid polymer formation. These compounds

are capable of forming complexes with various metal salts. The coloured complexes so formed are evaluated as pigments and only those of cobalt, copper and iron showed promising results.

## Keywords

### Raw materials for coatings prime pigments and dyes

organic pigment  
purple pigment  
green pigment

### raw materials used in the manufacture or synthesis of ingredients for coatings

dibasic acid  
dicarboxylic acid  
urea  
metal complexing compounds

## Nouveaux pigments à base des complexes métalliques

### Résumé

Des acides polycarboxyliques ont été préparés récemment par la condensation des acides dibasiques avec urée ou des dérivés d'urée, sous de telles conditions que la formation de polymères était évitée. Ces composés sont capables de former des com-

plexes avec divers sels métalliques. Les complexes colorés étaient évalués en tant que pigments, et les seuls qui donnaient des résultats pleins de promesse sont ceux de cobalt, de cuivre et de fer.

## Neue Metallkomplexpigmente

### Zusammenfassung

Polycarbonsäuren sind neulich hergestellt worden durch die Kondensierung von zwei basischen Säuren mit Harnstoff oder Harnstoffderivativen, unter solchen Bedingungen dass Polymerbildung vermieden ist. Diese Verbindungen können

Komplexe mit verschiedenen Metallsalzen bilden. Die sich ergebenden gefärbten Komplexe wurden als Pigmente bewertet und, nur diejenige aus Kobalt, Kupfer und Eisen boten viel sprechende Resultate an.

## Introduction

Refs. 1-4

The application of metal chelates in various branches of theoretical and applied chemistry is well recognised. The development of the theory of chelation offers a basis for new developments in the field of pigments and lakes, such as alizarine phthalocyanine etc.

There are many types of organic pigments and the organo-metallic complex type of pigments are widely used in surface coatings.

Recently various polyfunctional compounds were prepared by the condensation of urea or urea derivatives with dibasic acids. These compounds are capable of forming complexes with various metal salts<sup>1-4</sup>.

This article is mainly concerned with the new metal

chelates of the polyfunctional urea/acid condensation products, which showed outstanding properties which make them suitable as pigments.

## Experimental

### Preparation of the tetrafunctional ligand (I-III)

The preparation of the tetrabasic acid was carried out by placing the dibasic acid (oxalic or succinic acid) (4 moles) with urea or thiourea (1 mole) in a 250 ml round-bottom flask fitted with Dean & Stark apparatus.

The mixture was heated under reflux with xylene until the theoretical amount of water had been collected. The reaction mixture was then cooled to room temperature, filtered and dried at 50°C under vacuum. The solid collected was recrystallised from a suitable solvent. The characteristics of the various products obtained are given in Table 1.

Table 1  
Characteristics of various ligands

No.	Name	Cryst. solvent	Colour	m.p. °C	Acidity (mg KOH)
I	Tetraoxalyl urea	water	white	129-131	666
II	Tetraoxalyl thiourea	water	yellow	135-136	627
III	Tetrasuccinyl urea	acetone	white	106-107	501



Table 4  
Mass- and tint-tone colours of  
various metal complexes

No.	Mass-tone colour	Tint-tone* colour	Degree of whiteness (%)†	
			0.1%	1%
Ia	Pale purple	Pale purple	81	57
Ib	Green	Pale green	83	59
IIa	Pale purple	Pale purple	80	62
IIIa	Pale green	Blueish green	74	53
IIIb	Buff	Light brown	71	50

\*1% in 1% ZnO

†60% TiO<sub>2</sub> containing the pigment and 40% boiled linseed oil

Although these complexes are characterised by moderate values of hiding power, they do show remarkable tictorial strength. The presence of these complexes in paint compositions does not significantly affect the gloss of their corresponding dry films.

These complexes undergo decomposition when subjected to the spot test, which is conducted to serve as a rapid and simple technique for identifying organic pigments, other than those based on TSU.

Chemical resistance studies indicated that they are

slightly affected when subjected to immersion in 2 per cent NaOH and saturated Ca(OH)<sub>2</sub> and almost unaffected by 5 per cent Na<sub>2</sub>CO<sub>3</sub> and 5 per cent H<sub>2</sub>SO<sub>4</sub>.

The conclusions drawn from the above data indicate that these metal complexes have promising properties which make them suitable for use as pigments in various organic coatings. In addition, this new type of compound opens up the possibility of carrying out further investigation with the aim of improving their pigmentary properties and developing new pigments.

[Received 7 March 1980]

## References

1. Abd El-Ghafar, M. A., PhD thesis submitted to Faculty of Science, Al-Azhar University (1978).
2. Khouzondar, A. N., MSc thesis submitted to Faculty of Science, Al-Azhar University (1979).
3. Salman, A. A., Abd-Ellah, I. M., Naser, A. M., Abd El-Ghafar, M. A. and Khouzondar, A. N., 1980, awaiting publication.
4. Abd-Ellah, I. M. of Salman, A. A., Abd-Ghfar, M. A., and Nasser, A. M., 1980, awaiting publication.
5. Veer, W. V. and Jellinek, F., *Receveil, Laboratorium Vor Anorg. Chemie, Rijksuniversitat, Groningen, The Netherlands*, 1966, **85**, 842.
6. Naser, A. M., Naoum, M. M., Salman, A. A. and Taha, A., *JOCCA*, 1978, **61**, 372.

## Corrigenda

### Effect of solvent on residual strain in clear epoxy coatings

By S. G. Croll, *JOCCA*, 1980, **63**, 230

It is regretted that on page 236 of the June issue of *JOCCA*, the references given for the above paper were incomplete.

The additions required are as follows:

6. Croll, S. G. *J. Coatings Technol.*, 1980, **52** (664), 65.
8. Lunak, S., Vladyka, J. and Dusek, K. *Polymer*, 1978, **19** (8), 931.

## 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*:

**Paints and painting problems in the tropics** by *F. B. Adefarati*

**Studies on adhesion; effect of part replacement of TiO<sub>2</sub> by ZnO extenders in alky based TiO<sub>2</sub> paints** by *M. N. Sathyanarayana, P. S. Sampathkumaran and M. A. Sivasamban*

**Titanium dioxide in decorative emulsion paints** by *J. Valpola*

**Direct volumetric determination of n-butanol in nitrocellulose thinner** (short communication) by *R. Prakash and I. C. Shukla*

## Short Communication

# American study on mortality rates in the coatings industry, preliminary details published

CEPE, 49 Square Marie-Louise, 1040 Brussels

The National Paint and Coatings Association (NPCA) of the United States has just announced that a mortality study of workers employed in the American paint and surface coatings industry has shown that the death rate for these workers is below that of the US population as a whole, and is broadly comparable to that of other industrial groups.

NPCA sponsored this research and provided the main funding. Additional support came from both the Canadian association (CPMA) and from the European Committee of Paint, Printing Ink and Artists' Colours Manufacturers' Associations (CEPE). CEPE represents the manufacturers' associations of the paint and printing ink industries in seventeen European countries. It has a full-time secretariat based in Brussels.

The study was undertaken to determine scientifically if unrecognised hazards were affecting the health of paint and coatings employees. It took three years to complete and has so far cost more than US\$350,000.

SRI International of California, recognised worldwide as an independent research firm, and formerly associated with Stanford University, began the study in March 1977. Their final report was submitted to NPCA in March 1980.

NPCA Executive Director Larry Thomas stated "NPCA has sponsored this unusually broad and comprehensive study to develop data that will help us safeguard the health and lives of our workers. We are extremely pleased that the results show that the mortality rate for our workers compares favourably with those individuals in other occupations, especially since many of the raw materials used in the manufacture of our products have been questioned regarding possible hazard, toxicity or carcinogenicity".

The study was based on the records of over 15,000 workers in the USA and over half a billion man-hours of observation. Fourteen per cent of the workers studied were aged 60 or older, a circumstance which would permit the identification of deaths from diseases with long latency periods. The study was based on mortality data for workers who had been exposed to every type of raw material, manufacturing process or equipment cleaning activity commonly found in the industry.

Before the study began, the study protocol was reviewed by a number of epidemiologists and physicians, and two leading US agencies were also consulted, the National Institute for Occupational Safety and Health and

the Occupational Safety and Health Administration. The final draft of the study was independently reviewed by Professor Sir Richard Doll, Regius Professor of Medicine at Oxford University in England, by Dr Richard Monson of Harvard University and by Dr Philip Enterline of the University of Pittsburgh in the United States. These are probably the world's leading epidemiologists.

To ensure that the study receives even wider "peer" review by the world's scientific community, arrangements are in hand for the publication of articles describing the study and its results in detail in major scientific and medical journals in the USA and in Europe.

Overall, SRI concluded that workers employed in paint manufacture in the USA during a thirty year period, from 1 January 1946 to 31 December 1976, experienced a level of mortality below that of the US white male population.

Comparisons were made by calculating a figure called the Standard Mortality Ratio (SMR) for each cause of death within the various sub-groups of the total worker group studied. An SMR of 100 means that the particular sub-group experienced the same mortality rate from a particular cause of death as would be expected in the general population. A SMR below 100 means that the sub-group mortality rate is less than that of the general population.

The overall SMR for paint and coatings manufacturing workers was 86, which SRI has indicated is typical for an industrial study population. It should be noted that people who are hired for industrial jobs are generally healthier, and do not have as many of the serious health problems and disabilities that are found in the population as a whole.

The SMR's calculated for some of the sub-groups were greater than those expected for the American population as a whole. None of them were statistically significant, but the NPCA has considered it responsible and appropriate that the data supporting these particular SMR's should be subjected to additional examination and analysis. NPCA, together with CEPE and CPMA, have arranged to sponsor and fund continuing study in these areas, which will be conducted by SRI as before.

CEPE will in due course receive this additional information, possibly by the end of this year. When final analysis and interpretation becomes fully available it intends to ensure wide dissemination of the results. Meanwhile, for any further information please contact the address above.

# ANNUAL REPORT OF THE COUNCIL FOR 1979

Adopted at the Eighteenth Annual General Meeting of the Incorporated Association, held on Thursday, 26 June 1980 at the Piccadilly Hotel, London W.1., England at 3.00 p.m.

## General

The year under review was one of the most difficult ones which the Association has faced for many years. At the commencement of the year, industrial action by transport workers delayed deliveries of paper for the Association's *Journal*, which is purchased in bulk by the Association in order to effect considerable savings on cost, and in April the *Journal's* printers since 1950 went into liquidation necessitating two changes of printers in successive months. Nevertheless, it was possible to maintain production not only of the *Journal* but of the pre-prints for the Conference.

The thirty-first Technical Exhibition took place at Alexandra Palace, London, N22 from 3 to 6 April and attracted exhibitors from fifteen countries, and 116 organisations were represented at this Exhibition. A report appears later under the heading "Exhibition Committee" and a review appeared in the June issue of the *Journal*.

The Seventeenth Annual General Meeting of the Incorporated Association took place at the Stratford Hilton Hotel, Stratford-upon-Avon on 22 June 1979. Dr F. M. Smith was elected President and the following Vice-Presidents were elected:

Mr C. Gooch  
Mr S. R. Finn  
Mr P. A. J. Gate  
Mr J. L. Inshaw  
Mr R. C. Somerville  
Mr T. W. Wilkinson  
Mr H. K. R. Nielsen

The Honorary Officers were elected as follows:

Honorary Secretary . . . . . Mr D. J. Morris  
Honorary Treasurer . . . . . Dr H. R. Hamburg  
Honorary Editor . . . . . Mr S. R. Finn  
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 1979 - 1981:

Mr C. Barker  
Mr A. T. S. Rudram  
Mr B. F. Gilliam

Votes of thanks to the retiring President and Council members, to the Honorary Officers and to the Director & Secretary were carried with acclamation.

The Annual General Meeting took place at the end of the final session of the Association's Biennial Conference at Stratford-upon-Avon on "The challenge to coatings in a changing world".

The pattern of the Conference was different to those held in previous years in that it assembled on the Wednesday evening and dispersed on the Saturday, there being four technical sessions held on the mornings and afternoons of the Thursday and Friday.

A wide variety of visits was arranged for delegates' ladies and these were all well supported; delegates and their ladies also visited the Shakespeare Memorial Theatre on two of the evenings and the Association's Dinner Dance was held on Friday 22 June.

Amongst the Association's guests at the Dinner Dance on this occasion, in addition to the President of FATIPEC Dr Kooistra and Mrs Kooistra, the President of SLF, Dr Borje Andersson and Mr Leonard Davidson representing the FSCT and Mrs Davidson (all of whom had been present throughout the Conference) were the Mayor and Mayoress of Stratford, Councillor and Mrs J. C. Duckett, the President of the Paintmakers Association, Mr L. H. Silver (a former President of this Association), the President of the Society of British Printing Ink Manufacturers, Mr J. Houghton and Mrs Houghton and the President of the Society of Dyers and Colourists, Dr J. K. Skelly and Mrs Skelly.

The Conference was one of the most successful held by the Association and a full report appeared in the August issue of the *Journal*.

During the year Council conferred Honorary Membership upon Stanley Russell Finn, the Association's Honorary Editor since 1969 (and currently a Vice-President) to express the admiration of the Members for the way in which he has at all times discharged his duties and raised the prestige of the Association's publications, particularly the *Journal*, to its eminent position in the surface coatings industries. The President and Director & Secretary presented the Scroll of Honorary Membership to Mr Finn on 1 December at his home in Hull.

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

The Eastern Branch of the Scottish Section held a "Printing ink symposium for junior technologists" on 17 January which resulted in a considerable increase in the number of Registered Students attached to the Scottish Section.

The London Section held a day meeting with the Institution of Corrosion Science and Technology at the Thames Polytechnic on "Maintenance painting of structural steel", on 16 March.

The South African Division organised a winter school in conjunction with the South African Chemical Institute and the South African Corrosion Institute from 2 - 3 July under the title "The role of protective coatings".

The New Zealand Division held its 16th Annual Convention at Rotorua from 26 - 29 July and this was well supported. During the year the constitution for the New Zealand Division was adopted by Council.

The Manchester Section organised a Discourse under the heading "The whys and wherefores of corrosion" on 13 September at the University of Manchester, UMIST. This represented an innovation in the method of the presentation of the subject matter which was particularly successful in attracting many delegates to participate in the discussion.

The Newcastle Section held a Student Seminar on 20 September at Durham University under the title "Fundamentals of paint technology".

The London Section held a day meeting on 21 November at the Thames Polytechnic, Woolwich under the heading "Pigments".

A Reunion Dinner for past and present members of Council was held on Wednesday 24 October at the Great Northern Hotel, London, N.1. There were 38 members present, including seven Past Presidents and three Past Honorary Officers. The dinner followed a Council meeting held earlier in the afternoon.

After the Loyal Toast, the President, Dr F. M. Smith gave his address of welcome stating that he was particularly pleased to be able to welcome the seven Past Presidents to the function, the three Past Honorary Officers and also Mr T. W. Slinn, a former Vice-President of the Association and a recipient of the Commendation Award, who was visiting the United Kingdom from New Zealand.

Dr Smith drew the attention of those present to the notes which had been provided, outlining the major events which had taken place since the 60th Anniversary Celebrations in May 1978.

During the year, a former Vice-President of the South African Division, Mr D. J. Pienaar, Mr D. Smith of the Cape Section Committee, Mr S. L. Davidson, a former President of the FSCT as well as Mr T. W. Slinn, visited the United Kingdom and had discussions with the Director & Secretary on Association activities. As recorded above, Mr Slinn was able to attend the Reunion Dinner and also had discussions with the President and Honorary Treasurer.

A Forward Thinking Group was formed, consisting of the President, Immediate Past President, Mr I. R. McCallum, Mr J. R. Bourne and the Director & Secretary and the Group met three times.

Council learnt with regret of the death of Mrs C. E. Friend, widow of Dr J. N. Friend (President 1922-24) and of the following members or former members:

Mr J. E. Judah  
Dr T. Long  
Mr D. Metcalf  
Mr D. G. Soar  
Mr F. S. Wilson

Obituary notices appeared in the *Journal*.

In the Annual Report for 1978 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 1979. This has continued the increased burden on the Director & Secretary which has entailed a considerable sacrifice of both holiday and leisure time. The Council is sure that Members will wish to record their thanks to the Director & Secretary for his continued efforts under such adverse circumstances on behalf of the Association.

### Membership of the Association

Council is pleased to report that the total membership has slightly increased during the year and the figures given below at 31 December 1979 relate only to those members whose 1979 subscriptions have been received; the names of those in arrears with subscriptions have been removed:

Section	Ordinary	Associate	Honorary	Student	Total
Bristol	66	12	-	-	78
Hull	44	3	1	-	48
Irish	36	12	-	-	48
London	508	46	4	6	564
Manchester	349	43	1	19	412
Midlands (including Trent Valley Branch)	163	17	-	3	183
Newcastle	110	6	-	7	123
Scottish (including Eastern Branch)	99	18	-	39	156
Thames Valley	99	20	-	2	121
West Riding	79	14	-	5	98
General Overseas	357	24	2	2	385
Zimbabwe Branch	23	8	-	-	31
Ontario	68	12	-	-	80
New Zealand Division					
Auckland	119	44	-	1	164
Wellington	63	30	-	1	94
South African Division					
Cape	41	14	-	-	55
Natal	83	20	1	2	106
Transvaal	100	26	-	-	126
<b>Total 1979</b>	<b>2407</b>	<b>369</b>	<b>9</b>	<b>87</b>	<b>2872</b>
<b>Total 1978</b>	<b>2427</b>	<b>362</b>	<b>8</b>	<b>61</b>	<b>2858</b>
Net increase/decrease during 1979	-20	+7	+1	+26	+14

### The Council

During the calendar year the Council has met four times, the average attendance being 26. All meetings were held in London.

### Committees of the Council

The Committees of Council met as set forth below:

Exhibition Committee	3
Finance Committee	2
Liaison Committee	1
President's Advisory Committee	4
Professional Grade Committee	4
Technical Committee	1
Jordan Award Committee	1
Technical Education Committee	1
Forward Thinking Group	3
Publications Committee	-

*Exhibition Committee*

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

The Thirty-first Technical Exhibition was held at Alexandra Palace, London, N.22 and a full report of the Exhibition, including the review of the stands appeared in the June issue of the *Journal*; the Exhibition Committee recorded its thanks to Mr S. R. Finn, the Honorary Editor, who prepared the review.

On the opening day a buffet luncheon was held for principal officers of other societies and special guests and in the afternoon the Exhibition Committee conducted them round the stands. On this occasion the Committee were pleased to welcome the Management Committee of the Paintmakers Association and to arrange for a meeting of that Committee to take place at Alexandra Palace later in the afternoon.

Throughout the year discussions took place with representatives of other organisations represented on the Exhibitors' Liaison Group which was mentioned in the Annual Report for 1978 and, as a result of these discussions, it was agreed to move the venue of the Exhibition for 1980 to a more centrally situated site in London and also to make arrangements for different methods of exhibition facilities in both the traditional shell scheme type of exhibition and in the more informal exhibits displayed in rooms at the Cunard International Hotel.

*Finance Committee*

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

During the year the opportunity was taken of realising certain of the equities which had been held by the Association for some years and the funds obtained were held on deposit. The market value of the investments held at the end of the year showed that the equities stood at £511 above their purchase price, but that the market value of the British Government Securities was £1,435 below their purchase price.

The Finance Committee felt that members would appreciate that in times of inflation it was necessary for the subscription to be reviewed annually rather than biennially and advised Council accordingly.

*Jordan Award Committee*

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

The Jordan Award Committee conferred the award jointly on Dr T. A. Egerton and Miss C. J. King for their paper "The influence of light intensity on photoactivity in TiO<sub>2</sub>

pigmented systems". The certificates and cheques were presented at the Annual General Meeting on 22 June.

*Liaison Committee*

Chairman: The President

A meeting of the Association's Liaison Committee was held at Stratford-upon-Avon on 21 June when various items of common interest were discussed with representatives of FATIPEC, the SLF, the FSCT and OCCA Australia. On the day on which the Stratford Conference terminated, 23 June, a meeting was held in Paris which was attended by the President at which agreement was reached to form an International Co-ordinating Committee; FATIPEC kindly offered secretarial services for the first three years and it was agreed that further discussions would take place at the FSCT Convention which was held in St. Louis, Missouri, USA, 3-5 October, and further discussions will take place at the FATIPEC Conference to be held in Amsterdam, 8-13 June 1980.

The President was present at the FSCT Convention in St. Louis and at the SLF Convention in Stockholm, 15-17 October, and his impressions on these occasions were printed in the January 1980 issue of the *Journal*.

*President's Advisory Committee*

Chairman: The President

For the 1979/80 session, Dr F. M. Smith invited the Chairmen of the Hull Section, Mr R. Brooks; the Midlands Section, Mr J. A. Burns and the Thames Valley Section, Mr G. V. G. Hill, all of whom were in their second year of office, to serve on the Committee, together with the Honorary Officers of the Association.

*Professional Grade Committee*

Chairman: The President

The Professional Grade Committee received recommendations from the Association's Technical Education Committee during the autumn in respect of the new courses introduced by the Technician Education Council and the Scottish Technical Education Council, and it was agreed that holders of the Higher Certificates or Diplomas awarded by those bodies would enable them to register for Licentiatehip of the Professional Grade.

It was further agreed to accept the Technical Education Committee's recommendation that the period of qualifying technical experience should not necessarily be post-examination, but might be at any time before, during or following the course with the proviso that it was not expected that sufficient experience would be normally gained in less than two years.

	Applications received	Applications transferred between grades	Successful	Awaiting fulfilment of regulations	Not accepted	Resignations and deaths	Upgradings	As shown in December 1979 <i>Journal</i> *
Fellowship	242	Less 48 Add 10	192	8	4	23	-	169
Associateship	333	Less 21 Add 60	323	29	20	30	8	285
Licentiatehip	47	Less 12 Add 11	19	16	11	-	10	9
	622	-	534	53	35	53	18	463

\*Including the United Kingdom and Ireland, 34 countries are represented in the list of successful candidates published in the December 1979 issue of the *Journal*.

The Council endorsed these recommendations at its October meeting and full details of the new regulations appeared in the December issue of the *Journal*.

During the year, the Committee discussed on several occasions the low standard of dissertations which had been submitted by candidates for the Licentiatehip and felt that the attention of senior members of the Association and those lecturing in technical institutes should be drawn to this aspect.

A full list of Members admitted to the various grades appeared in the December 1979 issue of the *Journal* and the table shows the position in the various categories of Professional Grade at the end of the year.

#### Technical Committee

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

During the year the Technical Committee met to receive a report on the Technical Sessions of the Stratford Conference and to consider the format and subject for the 1981 Biennial Conference. The Committee also considered the co-ordination of symposia and student seminars which were being planned by Sections during 1980.

#### Technical Education Committee

Chairman: The President

The Membership of the Technical Education Committee was enlarged at the July Council meeting in order to increase the number of representatives from technical colleges.

At its meeting in the autumn the Committee discussed the effect of the new Technician Education Courses and Scottish Technical Courses and unanimously agreed to recommend to the Professional Grade Committee and, through that Committee to the Council, that the Higher Certificates and Diplomas awarded by these bodies should be taken as starting points for the Licentiatehip of the Professional Grade. It also recommended that the period of experience required under the Professional Grade Regulations should be amended so that a candidate could count relevant technical experience before, during or following his courses with the proviso that it was not expected that a period of less than two years would enable the candidate to achieve the necessary depth of technical experience. These recommendations were passed to the Professional Grade Committee and through them to the Council as stated in the Professional Grade Committee report.

Liaison has also been maintained with the CAPITB, the Paintmakers Association and the Society of British Printing Ink Manufacturers and details of courses available at technical colleges appeared in the August issue of the *Journal*.

#### Publications Committee

Chairman: The Honorary Editor, Mr S. R. Finn

The year covered by this report has been difficult in several respects, but mainly because the printers of the *Journal* went into liquidation during the spring. The Committee is greatly indebted to Mr R. H. Hamblin, the Director & Secretary, for his prompt action in retrieving

the stocks of paper and other property of the Association held at the printer's works. He was able to arrange the completion of the issue of *JOCCA* which had been partially printed and make arrangements for the next two or three issues until more permanent printers could be found. This naturally caused some delay in the completion of several issues of the *Journal*, but the date of appearance is now gradually improving. The change also necessitated a change in the printing process employed.

There was no meeting of the Publications Committee during the year, partly because there were few matters which could usefully have been discussed and partly on account of the pressure of other work on our headquarters.

No Student Reviews have been offered for publication during the year, but one of the proposed Monographs has been completed and it is hoped to be published in two parts in *JOCCA* early in 1980.

Forty-nine papers were published during the year, of which 12 originated from the Stratford-upon-Avon Conference and 7 from the South African Division's Cape Town Symposium. On account of these there was a decline in the number of the directly submitted papers published, but not in the numbers of them submitted for consideration. Twenty-five of the papers published were by overseas authors, if those given at the Conference are included. During the year, 8 books were reviewed, but only 4 letters to the Editor were published.

This year the *Journal* occupied 516 pages, of which 313 were technical papers (61 per cent). Twenty-two papers were directly submitted for publication (45 per cent) and twenty-five involved overseas authors (51 per cent).

In the November issue a Readership Survey Form was enclosed and the results of the survey were most encouraging; details will be appearing in 1980 when sufficient time has elapsed for members and subscribers overseas to return their completed forms. In the December issue of the *Journal* a Reader Enquiry Service was introduced which has already proved to be of considerable use to many readers.

<i>Papers originating from Section symposia and lectures:</i>	1977	1978	1979
Bristol	—	—	1
Hull	—	1	—
Irish	—	1	—
London	5	1	1
Manchester	6	2	1
Midlands	—	—	—
Newcastle	2	11	—
New Zealand Division	—	—	—
Ontario	—	—	—
Scottish	—	—	—
South African Division	5	1	7
Thames Valley	1	—	3
West Riding	—	—	—
	19	17	13
<i>Papers submitted directly:</i>			
United Kingdom	5	4	7
Overseas	11	29	16
Conference	14	—	12
Association lecture	—	1	1
	30	34	36
Total	49	51	49



The Honorary Editor wishes to thank the Honorary Publications Officers for the Section Reports and all those who have contributed to Book Reviews, and in other ways.

### Representations 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. Worsdall and Mr W. R. Moon (to December 1979 then Mr G. A. Tabbernor).

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

The British National Committee for Chemistry: Dr R. C. Denney to July 1979 – Dr G. D. Parfitt from December 1979.

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 Programmes Officer of the London Section and the Director & Secretary.

The Paintmakers Association Training and Technical Education Committee: Mr A. T. S. Rudram, the Honorary Secretary and the Director & Secretary.

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

The Society of Dyers and Colourists Terms and Definitions Committee: Mr J. T. Tooke-Kirby and Mr D. M. Varley.

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

The Colour Group (Great Britain): Mr I. Ford to October 1979 – Mr K. Lord appointed in January 1980.

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

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

Scottish Technical Education Council Sub-Committee: Mr R. Barrett to 31 July 1979, when representation completed.

British Standards Institution:

PVC Pigments, Paints & Varnishes Industry Committee: Mr R. G. J. Toms

PVC/1 Pigments: Mr E. A. Peters

PVC/1/6 White Pigments: Mr S. A. Ray

PVC/1/8 Chrome Pigments, Prussian Blue and Zinc Phosphate: Mr D. S. Newton

PVC/1/11 Extenders: (inactive at moment) Mr S. A. Ray

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

PVC/8 Plastic Wood: Mr V. P. Gellay

PVC/10 Test methods for Paints: Mr A. N. McKelvie

PVC/11 Glossary of Paint Terms: Mr S. A. Ray

PVC/12 Organic Pigments: Mr J. McAllister

PVC/14 Colour Schedules: Mr A. B. Lock

PVC/15 Water Paints and Distempers: Mr T. W. Wilkinson

PVC/16 Ready Mixed Oil Paints: Mr A. T. S. Rudram (now amalgamated)

PVC/19 Bituminous Paints: Mr R. Lang

PVC/20 Calcium Plumbate Priming Paints: Mr M. Pettit

PVC/21 Rusting and Preparation Grades: Mr A. N. McKelvie

PVC/23 Zinc Rich Paints: Dr D. Atherton

PVC/24 Water Thinned Wood Priming Paints: Mr W. Phillips

PVC/25 Organic Finishes for Aluminium Windows: Mr D. E. Hopper

LGL/9 Artificial Daylight for Colour Matching: Mr I. Ford to October 1979 – Mr K. Lord appointed in January 1980.

C/17 Viscosity: Mr A. N. McKelvie

C/17/2 Revision of BS188 (Drafting): Mr A. N. McKelvie

CHE/43/1 Sieves, Sieving and other Sizing Methods: Mr D. S. Newton

CHE/43/2 Test Methods for Powder Properties: 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

OFC/12 Vegetable Oils: Mr M. Beresford

OFC/24 Analysis of Oilseeds, Oils and Fats: Mr M. Beresford

GEL/16/53/6 Varnishes: Mr N. H. Seymour

ACE/44 Aircraft Finishes: Mr J. B. G. Lewin

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: Mr J. Orpwood

The Association was also represented on overseas organisations as follows:

### 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 – Non Toxic Coatings: Mr R. E. Rouse.

SAPMA Witwatersrand Technical Education Committee for Paint Science: Mr P. A. J. Gate and Mr H. Bosman.

## Appendix

### Report of the Council in accordance with the Companies Act 1967

1. The Council presents herewith the audited accounts of the Association for the year ended 31 December 1979.

#### 2. Results

The results for the year and the appropriation thereof are set out in the Income and Expenditure Account on page (10).

#### 3. 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.

#### 4. Change in fixed assets

The movement in fixed assets during the year is set out in the Table on page (11).

5. *The Council*

The following were members of Council at 31 December 1979:

F. M. Smith, BSc, PhD, CChem, FRIC, CCol, FSDC, MIOP, FTSC  
 A. McLean, BSc, ARCST, CChem, FRIC, FTSC  
 C. Gooch, FTSC  
 S. R. Finn, BSc, FRIC, FTSC  
 P. A. J. Gate, BSc, FTSC  
 J. L. Inshaw, MRIC, ACTC, FTSC  
 R. C. Somerville  
 T. W. Wilkinson, ATCT, FTSC  
 H. K. R. Nielsen, BSc, FTSC  
 D. J. Morris  
 H. R. Hamburg, PhD, FTSC  
 C. N. Finlay, ATSC  
 C. Barker  
 A. T. S. Rudram, FTSC (*elected 22 June 1979*)  
 B. F. Gilliam, ATSC (*elected 22 June 1979*)  
 J. R. Taylor, BSc, FRIC, FTSC  
 C. H. Morris  
 J. D. W. Davidson, FIPE, FIWM, FICorrT, FTSC  
 W. G. Paul (*elected 1 August 1979*)  
 L. H. Silver  
 D. N. Fidler, MSc  
 Mrs E. N. Harper  
 A. R. Byrns, ATSC  
 T. Entwistle, FTSC  
 R. Brooks  
 P. W. Munn, BSc, CChem, MRIC, AMBIM  
 K. Callaghan  
 T. A. Banfield, PhD, DIC, ARCS, FICorrT, FTSC  
 A. J. Newbould, BSc, MRIC (*elected 19 April 1979*)  
 A. C. Jolly, BSc, FTSC  
 F. Redman, ATSC (*elected 20 April 1979*)  
 J. A. Burns  
 R. L. Devenish (*elected 20 April 1979*)  
 D. E. A. Williams-Wynn, MSc, PhD, CChem, FRIC (*elected 2 April 1979*)  
 J. Clark, BSc  
 F. Hellens, CChem, MRIC, MCIC  
 S. Patel, BSc (*elected 18 April 1979*)

H. C. Worsdall, FTSC  
 I. R. McCallum, LRIC, ATSC  
 T. L. M. Humphrey, ATSC  
 G. V. G. Hill, BSc, AMICorrT, LRPS, ATSC  
 V. A. Moore, AIMF (*elected 19 April 1979*)  
 A. G. Shepherd  
 G. L. Willis, BAgSc (*elected 22 February 1979*)  
 G. Willison, MRIC  
 M. G. Bentley, ATSC  
 R. A. C. Chappell, MRIC (*elected 3 April 1979*)

In addition the following were members of Council at 1 January 1979 and served during the year; the date shown after each name denotes when during 1979 service on Council terminated:

R. J. King, BSc, AWP, ATSC (*20 April 1979*)  
 M. H. Prigmore (*19 April 1979*)  
 M. J. Cochrane (*3 April 1979*)  
 F. Sowerbutts, BSc(Tech), FTSC (*20 March 1979*)  
 D. A. Bayliss, FTSC (*19 April 1979*)  
 R. A. Ness, BSc, ATSC (*20 March 1979*)  
 W. Fibiger (*18 April 1979*)  
 L. F. Saunders, FTSC (*2 April 1979*)  
 P. F. Sharp, BSc, ATSC (*22 June 1979*)  
 D. Eddowes, BSc (*22 June 1979*)

*Note:* Mr I. Feder served as Chairman of Auckland Section from 20 March to 1 August.

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 1980

**OIL AND COLOUR CHEMISTS' ASSOCIATION**

BALANCE SHEET as at 31 December 1979

1978		1979		1978		1979	
£	£	£	£	£	£	£	£
		<b>ACCUMULATED FUNDS—</b>				<b>FIXED ASSETS—(Note 1)</b>	
111,983		Balance at 1 January . . . . .	107,587			Furniture, Fittings, Office	
(4,396)		Add Surplus for the year/		12,115		Machines and Motor Car	
		Less deficit 1978 . . . . .	2,279			at cost . . . . .	12,115
107,587				(10,770)		Less Accumulated Depre-	(11,132)
			109,866			ciation . . . . .	
		<b>CURRENT LIABILITIES—</b>		1,345		Freehold Property at cost . . . . .	73,631
45,927		Receipts in advance . . . . .	84,412	73,631		Less Accumulated Depre-	
		Creditors and Accrued		(1,300)		ciation . . . . .	(2,100)
19,363		Liabilities . . . . .	25,150				
65,290			109,562	72,331			71,531
				73,676			72,514
						<b>LISTED INVESTMENTS—</b>	
						British Government Securi-	
				12,110		ties at cost . . . . .	12,110
						(Market value £10,675)	
						(Market value 1978	
						£10,891)	
				19,219		Other Investments at cost	11,406
						(Market value £11,918)	
						(Market value 1978	
						£27,313)	
				31,329			23,516
						<b>CURRENT ASSETS—</b>	
						Stock of unsold publica-	
				1,618		tions at cost (Note 7)	1,038
						Paper stock in hand at cost	
				865		(Note 7) . . . . .	2,418
						Debtors and Payments in	
				6,789		Advance . . . . .	8,408
						Balance at Bankers and	
						Cash in Hand in United	
						Kingdom and Overseas	
						Sections (Note 8) . . . . .	111,534
				67,872			123,398
<u>£172,877</u>			<u>£219,428</u>	<u>£172,877</u>			<u>£219,428</u>

F. M. SMITH  
President

H. R. HAMBURG  
Hon. Treasurer

R. H. HAMBLIN  
Director and Secretary

COOPERS &amp; LYBRAND

Chartered Accountants

London, 16th April 1980

Note: The page references given in the paragraph above and on subsequent pages are equivalent to page 347 and 351 in this Journal

**OIL AND COLOUR CHEMISTS' ASSOCIATION**

## STATEMENT OF SOURCE AND APPLICATION OF FUNDS FOR THE YEAR ENDED 31 DECEMBER 1979

	Year ended 31.12.79	Year ended 31.12.78
	£	£
<b>SOURCE OF FUNDS</b>		
Unappropriated surplus/(deficit) for year . . . . .	2,279	(4,396)
Deduct/ profit on sale of investments and fixed assets . . . . .	(9,636)	
Adjustment for item not involving the movement of funds:		
Depreciation and amortisation . . . . .	1,162	1,908
<b>TOTAL GENERATED FROM OPERATIONS . . . . .</b>	<b>£(6,195)</b>	<b>£(2,488)</b>
<b>FUNDS FROM OTHER SOURCES</b>		
Proceeds from the sale of investments . . . . .	17,449	—
	<u>£11,254</u>	<u>£(2,488)</u>
<b>APPLICATION OF FUNDS</b>		
Purchase of fixed assets . . . . .	—	497
Purchase of investments . . . . .	—	—
	<u>—</u>	<u>497</u>
<b>INCREASE/(DECREASE) IN WORKING CAPITAL . . . . .</b>	<b>£11,254</b>	<b>£(2,985)</b>
<b>INCREASE/(DECREASE) IN WORKING CAPITAL comprises:</b>		
Increase/(Decrease) in stocks . . . . .	973	(1,568)
Increase/(Decrease) in debtors and payments in advance . . . . .	1,619	(4)
(Increase)/Decrease in current liabilities . . . . .	(44,272)	412
Movement in net liquid funds:		
Increase/(Decrease) in balance at bankers and cash . . . . .	52,934	(1,825)
	<u>£11,254</u>	<u>£(2,985)</u>

## OIL AND COLOUR CHEMISTS' ASSOCIATION

## INCOME &amp; EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER 1979

1978			1979	
£	£	£	£	£
		<b>INCOME</b>		
		MEMBERSHIP AND GENERAL INCOME—		
	36,780	Subscriptions . . . . .	37,230	
	168	Professional Grade Registration fees . . . . .	82	
	1,453	Entrance Fees . . . . .	843	
	1,860	Publications . . . . .	2,368	
	472	Sundry income . . . . .	158	
	—	Profit on sale of investment and fixed assets . . . . .	9,636	
	(1,074)	Section Surplus/(Deficit) (Note 5) . . . . .	2,171	
	—	Conference 1979 . . . . .	3,206	
	4,774	Investment Income . . . . .	7,584	
44,433				63,278
		JOURNAL RECEIPTS—		
	27,837	Advertising . . . . .	24,862	
	29,873	Sales . . . . .	37,806	
	2,460	OCCA Australia . . . . .	2,295	
	1,028	Reprints . . . . .	2,472	
61,198				67,435
44,060				39,540
149,691		EXHIBITION RECEIPTS—		
		<b>EXPENDITURE</b>		
		MEMBERSHIP AND GENERAL EXPENSES—		
	15,111	Administration expenses (Note 4) . . . . .	16,979	
	23,646	Journal . . . . .	23,240	
	10,665	Postage, printing and stationery . . . . .	13,052	
	615	Notices . . . . .	—	
	342	60th Anniversary Celebrations . . . . .	—	
	4,733	General expenses, including accountancy . . . . .	6,308	
55,112				59,579
		JOURNAL EXPENSES—		
	15,111	Administration expenses (Note 4) . . . . .	16,980	
	28,899	Printing and publication . . . . .	28,405	
	698	Reprints . . . . .	1,404	
	7,924	Postage and stationery . . . . .	5,136	
	1,816	General expenses . . . . .	2,314	
54,448				54,239
		EXHIBITION EXPENSES—		
	27,600	Direct expenses . . . . .	34,862	
	15,111	Administration expenses (Note 4) . . . . .	16,980	
	1,816	General expenses . . . . .	2,314	
44,527				54,156
154,087				167,974
(4,396)		Surplus for the year/(Deficit 1978) . . . . .		2,279
£(4,396)		Surplus for the year carried forward/ (Deficit 1978) . . . . .		£2,279

## STATEMENT OF RETAINED RESERVES

1978		1979
£		£
(4,396)	Surplus for the year/(Deficit 1978) . . . . .	2,279
111,983	Balance at 1 January . . . . .	107,587
<u>£107,587</u>		<u>£109,866</u>

## OIL AND COLOUR CHEMISTS' ASSOCIATION

## NOTES ON THE ACCOUNTS as at 31 December 1979

## 1. Fixed Assets

Cost	Furniture, Fittings, Office Machines and Motor Car		Freehold Property	
	£	£	£	£
At 1 January 1979	12,115		73,631	
Additions	—		—	
Disposals	—		—	
		12,115		73,631
<b>Depreciation</b>				
At 1 January 1979	10,770		1,300	
Disposals	—		—	
Charged to Income and Expenditure Account	362		800	
		(11,132)		(2,100)
Net Book Value at 31 December 1979		£983		£71,531

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 1979:

	1978	1979
New Zealand	\$1.913	\$2.270
South Africa	R1.765	R1.8455
Canada	\$2.418	\$2.620
Zimbabwe	—	\$1.4950

## 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:

1978		1979
£		£
34,027	Salaries including pensions	39,109
3,551	Agency Staff	5,173
532	Welfare	499
3,471	Rates, lighting and telephone	4,196
650	Audit Fee	800
281	Provision for obsolete stock	—
1,908	Depreciation of fixed assets	1,162
913	Maintenance (repainting Priory House)	—
<b>£45,333</b>		<b>£50,939</b>

The charge to each heading is therefore:

15,111	Membership	16,979
15,111	Journal	16,980
15,111	Exhibition	16,980
<b>£45,333</b>		<b>£50,939</b>

## 5. Section Surplus (1979) Deficit (1978)

1978		1979
£		£
(231)	Bristol	194
(22)	Hull	(135)
	(b) Irish	(467)
(227)	London	(375)
857	Manchester	1,384
238	Midlands	(186)
(88)	(a) Trent Valley Branch	72
(90)	Newcastle	(93)
(662)	Scottish	(464)
562	(a) Thames Valley	(296)
77	West Riding	(32)
(1,090)	Auckland	(613)
55	Wellington	(67)
(83)	(a) Natal	137
142	(a) Cape	1,931
(166)	(a) Transvaal	1,261
(346)	(a) Ontario	(77)
—	(a) Zimbabwe Branch	(3)
<b>£(1,074)</b>		<b>£2,171</b>

## NOTES:

- (1) (a) unaudited returns incorporated in the accounts 3.3.80
- (2) (b) estimated returns included in the accounts 3.3.80
- (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

1978		1979
£		£
37,379	Amounts on deposit	76,906
—	Savings Certificates	573
21,221	Current Accounts and Cash in Hand	34,055
<b>£58,600</b>		<b>£111,534</b>

Auditors' Report — Page 8

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

## INCOME &amp; EXPENDITURE ACCOUNT for the year ended 31 December 1979

1978		1979	1978		1979
£	<b>Expenditure</b>	£	£	<b>Income</b>	£
101	Income Tax on Investment Interest .....	103	245	Interest on Investments (Gross) .....	245
338	President's Expenses .....	-	-	Distribution from estate .....	17
(194)	Surplus (1979) .....	159			
	Less Deficit (1978) .....				
<u>£245</u>		<u>£262</u>	<u>£245</u>		<u>£262</u>

## BALANCE SHEET as at 31 December 1979

1978		1979	1978		1979
£	<b>Liabilities</b>	£	£	<b>Assets</b>	£
2,955	Accumulated Fund .....	2,761	2,446	British Government Securities at cost .....	2,446
(194)	Surplus (1979) .....	159		(Market Value £2,526) .....	
	Less Deficit (1978) .....		315	(1978 £2,509) .....	
				Balance at Bank .....	474
<u>£2,761</u>		<u>£2,920</u>	<u>£2,761</u>		<u>£2,920</u>

**JORDAN AWARD FUND**

## INCOME &amp; EXPENDITURE ACCOUNT for the year ended 31 December 1979

1978		1979	1978		1979
£	<b>Expenditure</b>	£	£	<b>Income</b>	£
-	Award .....	111	138	Interest on Investments (Gross) .....	138
138	Certificate .....	-			
	Surplus .....	27			
<u>£138</u>		<u>£138</u>	<u>£138</u>		<u>£138</u>

## BALANCE SHEET as at 31 December 1979

1978		1979	1978		1979
£	<b>Liabilities</b>	£	£	<b>Assets</b>	£
1,259	Accumulated Fund .....	1,397	1,007	British Government Securities at cost .....	1,007
138	Surplus .....	27		(Market Value £1,045) .....	
				(1978 £1,101) .....	
			390	Balance at Bank .....	417
<u>£1,397</u>		<u>£1,424</u>	<u>£1,397</u>		<u>£1,424</u>

# Proceedings of the Annual General Meeting

The Eighteenth Annual General Meeting of the Incorporated Association was held on 26 June 1980 at 3.00 pm at the Piccadilly Hotel, London W1 with the President (Dr F. M. Smith) in the Chair.

There were 28 Members and 1 visitor present. The notice convening the meeting was read.

## Apologies

Apologies for absence were received from Mr D. J. Silsby, Mr J. L. Inshaw, Mr D. H. Vettewinkel, Mr D. A. Bayliss, Mr J. R. Taylor, Dr S. H. Bell, Mr G. A. Campbell, Mr A. McLean and Mr F. Sowerbutts.

## Minutes

The President asked the meeting to take as read the Minutes of the Seventeenth Annual General Meeting held on 22 June 1979 as printed and circulated in *JOCCA*, pp 318-320 inclusive, August 1979. 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 1979

Mr D. J. Morris (Honorary Secretary) moved and Dr H. R. Hamburg (Honorary Treasurer) seconded the adoption of the Annual Report of the Council and the Statement of Accounts for 1979.

The President asked for comments; Mr N. A. Bennett and Mr D. Dasgupta asked questions on Section Accounts and the Conference Surplus respectively, to both of which the Director and Secretary replied.

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

## Appointment of President Designate

The President stated that as indicated on the Agenda, Mr D. J. Morris, who had just completed his six years' term of office as Honorary Secretary, had been appointed President Designate of the Association by the Council and he asked the Annual General Meeting to welcome the President Designate in the traditional manner by applause. Mr Morris stated that he wished to record his thanks for the honour bestowed upon him by the Council and he looked forward to his further participation in the affairs of the Association.

## 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 of the 7 Vice-Presidents, Mr C. Gooch and Mr S. R. Finn, were completing their second year of service, whereas the other 5 were commencing their two year period of service. He asked the meeting to note that as well as Vice-Presidents

from the South African and New Zealand Divisions, the Council had nominated Mr P. Birrell of the Ontario Section to serve in this capacity. The following were then elected as Vice-Presidents:

- (i) Mr R. A. Eglinton
- (ii) Mr C. Gooch
- (iii) Mr S. R. Finn
- (iv) Mr J. R. Taylor
- (v) Mr D. A. Bayliss
- (vi) Mr P. Birrell
- (vii) Mr J. A. Mitchell

## Election of Honorary Officers of the Association

The President stated that Mr Finn would be retiring after 11 years' distinguished service as Honorary Editor which had been marked by the conferment of Honorary Membership upon him, although he would remain on Council for a further year in his capacity as a Vice-President.

As already mentioned, Mr D. J. Morris had been appointed President Designate after completion of his term of office as Honorary Secretary so that two new appointments of Honorary Officers were required. The nominations of the Council for the offices of Honorary Secretary and Honorary Editor were Mr J. R. Bourne and Mr D. S. Newton respectively. Dr H. R. Hamburg and Mr C. N. Finlay would continue in office as Honorary Treasurer and Honorary Research and Development Officer respectively.

Upon being put to the Annual General 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 C. N. Finlay

## Announcement of election of three Elective Members to Council 1980-82

The President read the following report which had been received from the Auditors:

*We have scrutinised the voting papers for the three elective members of the Council received from the members in the United Kingdom, Irish and General Overseas Sections, and certify that the votes cast show that the following obtained the largest number of votes:*

C. BUTLER      J. SMETHURST  
L. P. G. GOODALE

*Six voting papers were rejected as not being in order.*

London                      COOPERS & LYBRAND  
17 June 1980                      Chartered Accountants

## Chairman of Sections for the coming session

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



Auckland	Mr W. G. Paul
Bristol	Mr L. J. Brooke
Cape	Mr D. F. Smith
Hull	Mr P. W. Munn
Irish	Mr R. N. Rea
London	Dr T. A. Banfield
Manchester	Mr A. C. Jolly
Midlands	Mr R. L. Devenish
Natal	Prof D. E. A. Williams-Wynn
Newcastle	Mr J. Clark
Ontario	Mr S. Patel
Scottish	Mr T. L. M. Humphrey
Thames Valley	Mr V. A. Moore
Transvaal	Mr R. E. Rouse
Wellington	Mr G. L. Willis
West Riding	Mr M. G. Bentley

### Membership subscription rates

The Honorary Treasurer proposed that, in accordance with Article 11, resolutions having been passed by the Council at two successive Council Meetings on 20 February 1980 and 2 April 1980, these be confirmed by the Annual General Meeting:

*That, with effect from 1 January 1981, the annual membership subscription rates in the various categories of membership shall be as follows:*

*Ordinary or Associate Member £20.00 per annum.*

*There will be no increase in the rates for Retired Members or Registered Students.*

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

Mr J. R. Bourne seconded the motion and it was agreed unanimously without comment.

### New Zealand Division Subscriptions 1980

Dr H. R. Hamburg explained that the New Zealand Division felt that they required a greater degree of financial autonomy and that it had been found possible to make arrangements which would allow for this, although it was still necessary for resolutions to be passed by the Council and confirmed at the Annual General Meeting.

Accordingly he proposed that the 1980 Ordinary and Associate membership rates for those members attached to the two New Zealand Sections of the New Zealand Division would be NZ\$30.00.

Mr L. H. Silver seconded the motion and it was agreed unanimously without comment.

### Reappointment of Auditors and fixing the remuneration thereof

It was proposed by Dr H. W. Keenan that Coopers & Lybrand (Chartered Accountants) be reappointed Auditors of the Association and that their fee for 1980 be £800. This was seconded by Mr J. A. L. Hawkey and carried unanimously.

### Vote of thanks to retiring Council Members

The President called upon Mr N. A. Bennett to propose a

vote of thanks to members retiring from Council and not serving in another capacity in the forthcoming Session. Mr Bennett considered that the vote of thanks to the retiring members should not be considered a formality and he recalled that it was exactly 20 years since he retired from Council as Immediate Past President. He felt that the membership owed a considerable debt of gratitude to members who had served as Vice-Presidents, Elective Members, Section Chairmen and Section Representatives and he wished this to be recorded in the proceedings of the Annual General Meeting.

The vote of thanks was then carried with acclamation.

### Vote of thanks to Honorary Officers of the Association

In proposing a vote of thanks to the Honorary Officers, Mr A. T. S. Rudram as a former Honorary Officer drew attention to the very considerable amount of work which had been undertaken on behalf of the Association by the Honorary Officers. He particularly wished to thank both Mr S. R. Finn and Mr D. J. Morris who, although retiring from their present positions would be remaining on Council, for their work on behalf of the Association and he wished to add his thanks also to Mr H. K. R. Neilsen a Vice-President from the General Overseas Section who was present at the Annual General Meeting, for his work in advancing the aims of the Association on the Continent. He asked the Annual General Meeting to show their appreciation to the Honorary Officers of the Association and this was carried with acclamation.

### Vote of thanks to Chairman of meeting

In proposing a vote of thanks to the Chairman of the meeting, Mr H. Gosling stated that the Manchester Section were proud of the part which they had always played in the affairs of the Association and Dr Smith was the fourth member attached to that Section who had been elected President of the Association. On behalf of the Past Presidents, Past Honorary Officers and Honorary Members who had been invited to attend the luncheon and lecture he extended thanks to the Honorary Officers and Council for the excellent arrangements which had been made for the function.

He then asked the meeting to show their appreciation to the President who had chaired the meeting so ably and this was carried with acclamation.

### Any other competent business

The President felt that the Annual General Meeting would wish to record a vote of thanks to the Director and Secretary and this was carried with acclamation.

Mr H. K. R. Neilsen who had served as a Vice-President of the Association 1978-80 wished to record the greetings of the Federation of Scandinavian Paint and Varnish Technologists and also how much he appreciated being asked to serve as a Vice-President though resident overseas, he felt, however, that this was a considerable help to members attached to the General Overseas Section. He hoped that it would be possible to continue with the exchange of lectures between the Danish Association and the London Section and he was pleased that Mr P. Fink-Jensen would be presenting a paper at the Bath Conference on behalf of the Scandinavian Paint and Varnish Technologists.

The President, in thanking Mr Neilsen for his kind remarks asked him to convey to the Scandinavian Paint and Varnish Technologists the greetings from the Association's Annual General Meeting.

Mr D. Dasgupta asked if the names of senior members of staff of the Association should be shown in the *Journal* as had been the practice when the Association had offices in Wax Chandlers Hall. The Director and Secretary

replied that although there had been four senior members of staff at Wax Chandlers Hall, the situation since moving to Priory House had been such that there was only one senior member of staff, the Assistant Editor, whose name was shown in the *Journal*.

There being no other competent business, the President declared the meeting closed at 3.28 pm.

## Association Annual General Meeting Luncheon and Lecture

Prior to the Annual General Meeting (the Proceedings of which appear above) the following events took place at the same venue, the Piccadilly Suite of the Piccadilly Hotel, London W1.

At 11 am a meeting of Past Presidents took place with Honorary Officers of the Association. Items of general interest concerning the future of the Association in relation to its present activities were discussed and the views of Past Presidents were of considerable interest to the Honorary Officers.

At 12.30 pm a reception for members and visitors was held followed by luncheon.

After the meal the President (Dr F. M. Smith) explained that it had been the custom for many years to hold a reunion dinner of the Council with Past Presidents, Honorary Officers and Honorary Members and on this occasion it had been decided to combine this function with the luncheon prior to the AGM. He was, therefore, very pleased to welcome the following Past Presidents:

Dr H. W. Keenan  
Mr H. Gosling  
Mr N. A. Bennett  
Mr L. H. Silver  
Mr A. T. S. Rudrum

He also extended a welcome to two Honorary Members, Mr G. Copping and Mr S. R. Finn. Finally he welcomed as the Association's Principal Guest, Professor Sir Hermann Bondi, FRS who would be delivering the lecture after the meal.

At 2 pm the company moved to another part of the Piccadilly Suite and the President introduced Sir Hermann Bondi to deliver his lecture entitled "Engery in the World". This was a stimulating and thought-provoking talk which encouraged a considerable number of interesting questions.

At the conclusion of the lecture Dr T. A. Banfield, Chairman of the London Section, moved a vote of thanks to the lecturer which was carried with acclamation.

## REPORT OF COUNCIL MEETING

A Meeting of the Council of the Association was held on 8 July 1980 at the Great Northern Hotel, King's Cross, London N1 at 2 p.m. with the President, Dr F. M. Smith in the Chair. There were 22 members present.

The President extended a welcome to all members serving on Council for the first time, both at home and abroad, and to those returning to Council after an absence.

It was reported that the Association single motif ties (with blue or maroon backgrounds) were available and that scarves incorporating the insignia would soon be available for members' ladies. A notice would appear in the *Journal* in due course.

The dates of the Council Meetings for the forthcoming session were agreed.

Consideration was given to the appointment of Committees of Council and representation of the Association on other organisations and these were agreed.

It was reported that there was considerable activity in the field of technical education within the industries and it was agreed, in accordance with the provisions of Article 65E, to appoint Mr. A. T. S. Rudram as Hon. Technical Education officer of the Association.

It was reported that the Annual General Meeting had taken place on 26 June and that the Council Reunion with Past Presidents, Past Hon. Officers and Hon. members

had taken place on the same day. The Members elected in the ballot were Mr. C. Butler, Mr. J. Smethurst and Mr. L. P. G. Goodale.

A report was received on the preliminary arrangements for the Association's Conference which will take place at Bath 17-20 June 1981, and it was noted with pleasure that offers of papers had been received from many sources, including FATIPEC and the SLF; it was hoped that a paper would also be provided by the FTSC.

A report on the 1980 Exhibition was received and particular interest was paid to the analysis of completed registration cards, which showed that a very high percentage of those attending held positions of responsibility. It was felt that the arrangements, which had offered a wide choice of methods of exhibiting, had met with general satisfaction from both exhibitors and visitors. Various points were noted for improving the flow of visitors for the 1981 Exhibition, which will take place 28-30 April 1981 at the Cunard International Hotel, Hammersmith, London W6. Discussion also took place on future arrangements for the Exhibition.

A report was received on the number of members whose 1980 subscriptions had not yet been received.

Reports were received on reader enquiry and advertising folders which had been prepared to send to companies and potential advertisers.

It was reported that the readership survey conducted

with the November 1979 issue had been certified by the Audit Bureau of Circulation to show an estimated average monthly readership of 22,408. The Readership Enquiry Service introduced in December had drawn a large number of enquiries.

Council were reminded that the closing date for the Jordan Award would be 31 December 1980 and that it was hoped to present the award at the Bath Conference. Details had appeared in the *Journal* and would be reprinted again during the Autumn.

The Director and Secretary reported that, at a meeting of the Professional Grade Committee held earlier in the day, four Fellows had been admitted and three Associates transferred to the Fellowship grade, two Associates had been admitted and four deferred for further consideration; one Licentiate was admitted. It was further reported that the Professional Grade Committee were considering possible amendments to the existing regulations but that it would be some time before these could be placed before Council.

The President reported on his visit to the FATIPEC Congress held on 8–13 June 1980 and on the meeting of the International Co-ordinating committee held during the Congress. He also reported briefly on a meeting which had been held with the representatives from the Institute of Metal Finishing, the Institution of Corrosion Science and Technology and several other bodies involved in the

surface treatment field on 30 April, which had been attended by him and the Director and Secretary. The object of this meeting had been to discuss closer co-operation between the various bodies; the Association had been invited to attend at a late stage and a further meeting would be taking place on 10 July, when the Association would once again send representatives so that they would be aware of developments. Council would be informed at its next meeting.

The Sections reported on their activities since the last Council Meeting.

As the President would be leaving shortly after the Council meeting to visit both the New Zealand Division Convention and the OCCA Australia Convention (at both of which he would be presenting papers), the Council recorded its best wishes to Dr and Mrs. Smith for a happy and successful visit and asked them to convey the greetings of the Council to both conventions.

Council learned with regret of the deaths of two distinguished members of the Association Mr. S. G. Clifford who had been Hon. Treasurer 1924–1925, Hon. Secretary 1926–1929, and Mr. A. McEwan of the Auckland Section who had been the recipient of a Commendation Award.

There being no other business, the President thanked Members for their attendance and declared the Meeting closed at 4.32 p.m.

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.

#### Ultramarine

Growing worldwide demand for ultramarine has led to a four year modernisation and expansion programme at the Hull factory of Reckitt's Colours Limited. Work is now well advanced on the first two phases, projected to cost in the region of £2.5m. Over the next two years, the company plans to spend a further £2.5m to complete the streamlining of production and increase output levels, which will include new production methods and technology.

Reader Enquiry Service No. 35

#### Non-toxic waterproofing

Index Finishes (UK) Ltd, have been awarded National Water Council Certificates in respect of Index Glaze Coat and Index Epoxy Putty Special Grade. This allows use of both these materials in potable water situations.

Reader Enquiry Service No. 31

#### Macawber Engineering

Macawber Engineering Limited of Doncaster has appointed Therplant (Ireland) Limited as sole distributors of its products throughout Ireland which includes the "Denseveyor" for conveying bulk solids pneumatically.

Reader Enquiry Service No. 34

#### Fulmer on Prestel

Access to information on the full range of services and facilities offered by the Fulmer Research Institute is now available on Prestel, the Post Office television information system. The activities of Fulmer covers engineering materials and all types of materials processes and product development.

Reader Enquiry Service No. 32

#### FD & C colorants

Following projected growth patterns for associated end-use products, the market for food, drug and cosmetics colorants in the USA is expected to expand by 54 per cent over the ten-year period ending 1987, this is according to a new study by Frost & Sullivan, Inc.

Reader Enquiry Service No. 38

#### Loctite

Loctite (UK) Limited, the specialist adhesive and sealant company at Welwyn Garden City, announces that it is expanding its operational site to virtually double its present size. Adjacent to the present headquarters a new £1m distribution centre is being developed for the company by the Commission for New Towns.

Reader Enquiry Service No. 37



#### Morris Ashby Ltd

Morris Ashby Ltd have moved to their new address at 3 Lincolns Inn Fields, London WC2A 3AA, their new telephone and telex numbers will be: Telephone 01-831 7252 Telex: 885737.

Reader Enquiry Service No. 36

#### Albright & Wilson doubles Malaysian phosphoric acid capacity

Albright & Wilson (Malaysia) Sdn Bhd has more than doubled production capacity of high quality thermal phosphoric acid at its plant in Port Kelang since last year.

The expansion is to meet growing demand from both the Malaysian Market, from neighbouring ASEAN countries and in the Far East generally. The company states that it is the only "thermal" phosphoric acid producer in South East Asia and last year, exports amounted to 65 per cent of total production.

Reader Enquiry Service No. 33

# news

## new products

### Rapid hose connectors

Quicker and more reliable coupling and uncoupling of pipes and hoses carrying solvents, dyes and paints can be achieved using a new range of cam and groove couplers from LCA Pipelines Ltd (the fittings are manufactured by the PT Coupling Company USA).

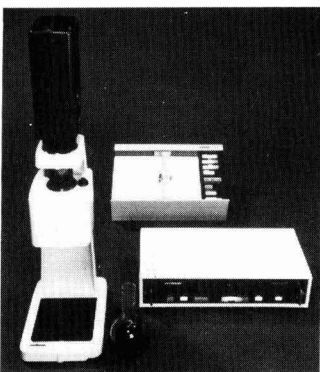
The fitting is in two parts, an adaptor and a coupler. To make the connection, the adaptor is placed in the coupler and using normal hand pressure, levers on the coupler close the joint, the seal being made with an integral gasket. To break the connection, the levers are simply released. Minimal wear occurs with the fittings because the gasket is stationary and not subject to frictional movement.

*Reader Enquiry Service No. 46*

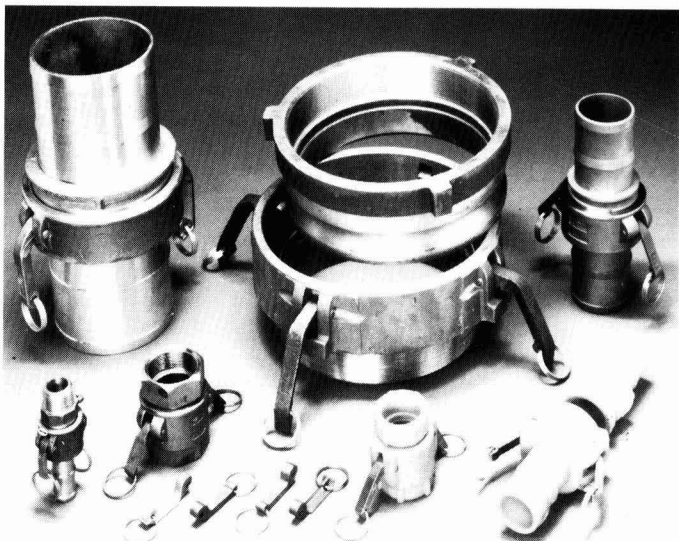
### New viscometer

Contraves have introduced a new laboratory viscometer called the Rheomat 115. It conforms fully to internationally accepted DIN standards of measurement and uses proven measurement techniques combined with microprocessor programming. Special features include fully programmable rotational speeds over the standard flow range. Rotational speed step is displayed digitally on the front panel of the instrument and torque range indication is from 0 to full range without switching. The instrument provides rotational speeds up to 780 rpm and allows a range of any shear rates of special interest to be selected using a module.

*Reader Enquiry Service No. 47*



The Rheomat 115 from Contraves



A selection of rapid pipe and hose connectors available from LCA Pipelines Ltd

### New paint systems

A new thermoplastic painting system for application on concrete surfaces where hygiene standards are critical has now been introduced by Polymer Products Ltd.

It is particularly suitable for use in abattoirs, meat processing plants, dairies and other premises where there are statutory hygiene standards as it will withstand repeated steam cleaning and caustic detergents.

The new painting system uses a unique combination of single-pack matt primer and a single-pack gloss topcoat. It has an indefinite shelf life and can be applied by brush, roller or standard sprays without special operator precautions.

Also introduced by Polymer Products Ltd is a new thermoplastic painting system for steelwork. It uses a unique combination of single-pack zinc-rich primer and single-pack top coat to give particularly good adhesion to the steel surface by a cold galvanising action, and by inter-coat fusion between coats. The system is therefore particularly easy to repair, as new coats will always fuse with the old. An added practical advantage, particularly for outdoor work, is that there is no critical time for recoating.

*Reader Enquiry Service No. 45*

### Credit Humidity Cabinets

John Godrich have introduced special Credit Humidity Cabinets to cater for larger components and higher volumes of work. These much larger cabinets, it is claimed, will still carry out tests to BS 3900 F2 or similar standards set by manufacturers. Where a component has to be operated in the high humidity

atmosphere an opening can be made in the cabinet to allow running trials to be carried out. The standard Credit Humidity Cabinet can also be produced to carry out the new ISO and ASTM condensation tests. Existing cabinets can easily be converted to conform by using the new accessory lid.

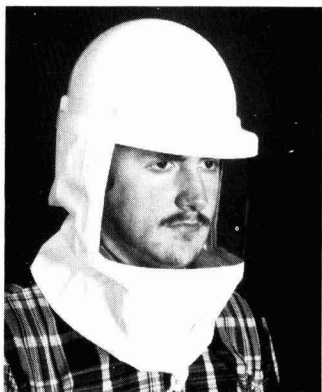
*Reader Enquiry Service No. 39*

### Hardcap Respiratory

New from 3M's Occupational Health & Safety Products group is the Hardcap Respirator.

Designed to provide both head and respiratory protection, the unit features a lightweight hard hat which meets the performance requirements of BS 5240:1975. Positive air pressure is created inside the helmet assembly from breathable quality compressed air which prevents inward leakage of contaminated air.

*Reader Enquiry Service No. 43*

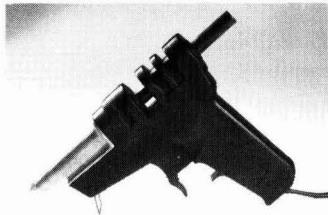


The Hardcap Respirator from 3M

## Adhesive gun

Power Adhesives Ltd have introduced a new packaging aid with applications in the paint manufacturing and allied industries. It is a lightweight hot melt adhesive dispensing gun called the Compact 85 for carton sealing and a wide variety of other packaging and general bonding applications.

Reader Enquiry Service No. 57



The Compact 85 – a hot melt adhesive dispensing gun

## New stoving resins

Synthetic Resins announce a new range of environmentally safe resins for industrial coatings (stoving enamels), they are completely reducible in water and contain no organic solvent.

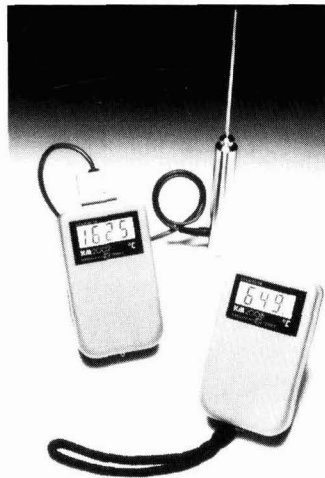
Reader Enquiry Service No. 56

## New digital thermometers

Called the Intrinsically safe KM 2002 and KM 2008 models, from Kane-May Instrumentation Ltd, these thermometers have wide BASEEFA certification which extends their use into numerous hazardous areas. Intrinsically safe probes for surface, air and liquid measurement are available.

Ranges are  $-30^{\circ}\text{C}$  to  $+800^{\circ}\text{C}$  on the KM 2008 with  $1.0^{\circ}\text{C}$  resolution, and  $-30^{\circ}\text{C}$  to  $+199.5^{\circ}\text{C}$  on the KM 2002 with  $0.5^{\circ}\text{C}$  resolution.

Reader Enquiry Service No. 40



The KM 2002 and the KM 2008 from Kane-May Instrumentation



The GBI packing station from Packing Aids Ltd

## Packing station

A new, low cost, fully self-contained packing station for a wide range of packing and wrapping applications within the paint manufacturing industry has been introduced by Ilford based, Packaging Aids Ltd. The GBI Packing Station features castors on the back legs for mobility and facilities for holding and cutting all kinds of wrapping materials in roll form.

Reader Enquiry Service No. 42

## Sigma Inks

Coates Brothers Ltd have developed Sigma Inks for the flexo or gravure converter printing on coextruded polypropylene films.

Designed primarily for the snack food market Coates say Sigma Inks have a high level of resistance to oils, fats and greases and excellent jaw release to ensure trouble-free running on all packaging machines.

Reader Enquiry Service No. 41



The Brooks-Mite 27 and the Ar-Mite 37 from Brooks Instrument

# news

## New resin for ink formulations

Goodrich Chemicals have announced a new water-borne acrylic resin for use as a pigment binder in printing, it has been especially designed for applications involving printing on treated polyethylene packaging materials, such as milk-cartons, bread-wrappers, or polyethylene film. It can also be used on other substrates that are difficult to print on.

Reader Enquiry Service No. 44

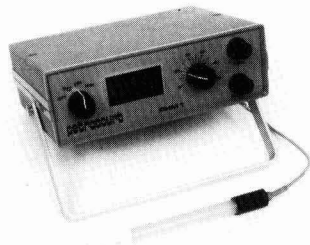
## New flowmeters

A flowmeter for low-flowrate metering of a wide range of liquids and gases has been developed by Brooks Instrument. Moulded from shatterproof polycarbonate thermoplastic (Lexan 21) the new direct reading "Brooks-Mite 27" has a standard accuracy of  $\pm 10$  per cent of full scale, it has a maximum operating temperature of  $55^{\circ}\text{C}$ .

For purge applications at pressures up to 68 bar, a new armoured version, the "Ar-Mite 37", is also available in which a metal tube replaces the glass. The internal float is magnetically coupled to an external indicator for direct reading. Specifications include  $\pm 10$  per cent accuracy over 5 scale ranges, from 57 l/h air and 1.3 l/h water to 1.44 m<sup>3</sup>/hr air and 42 l/h water each with a turndown ratio of 10:1.

Reader Enquiry Service No. 48

# news



The Model PTM1 from Petracourt Ltd

## New pH/temperature meter

Petracourt Limited have introduced a new addition to their range of pH and temperature meters for use in bench mounted applications.

Known as the Model PTM1 this new lightweight unit which is housed in a chemically resistant case will measure pH, temperature and millivolts to a resolution of 0.01 pH, 0.1°C and 1.0 mV. The instrument features a choice of fully automatic or manual temperature compensation and has a switchable millivolts/relative millivolt mode.

*Reader Enquiry Service No. 49*

# literature

## Threshold Value Limit Measurement

The Paintmakers Association of Great Britain Limited has issued two booklets on "Threshold Value Limit Measurement". A slimmer version is designed for management introduction to the subject and a spirally-bound version is designed as a working handbook for safety officers and those technically responsible for the measurement and control of working atmospheres in the factory.

The Health & Safety Executive have vetted the publication for accuracy under the Health and Safety at Work Act and other appropriate regulations. The Paintmakers Association commissioned the Paint Research Association to compile the guides. The booklets are available to non-members of the Association at £10 per set post paid from the following address: Paintmakers Association (GB) Ltd, Alembic House, 93 Albert Embankment, London SE1 7TY.

*Reader Enquiry Service No. 55*

## PRA special publication no. 13

"Quality Control Procedures when Blast Cleaning Steel - A Critical Survey of Methods of Determining Profile and Surface Cleanliness". This publication is available from the Paint Research Association and is intended to bring readers up to date with present international thinking on the best quality control procedures to use for measuring the profile and cleanliness of blast-cleaned steelwork.

*Reader Enquiry Service No. 54*

## Pollution directory

The "Directory of Pollution Control Equipment Companies in Western Europe" is now being published by European Directories. It brings together information on 6000 individual EEC pollution control companies. Price per copy is £25 (UK), £27 (Europe) and £29 (elsewhere).

*Reader Enquiry Service No. 51*

## Consulting scientists/contract research

The 5th (1980 Edition) of the "Register of Consulting Scientists and Contract Research Organisations" is now available from the Fulmer Research Institute. Some 300 alterations and additions have been made to the 4th Edition (1978) and the subject index extended.

*Reader Enquiry Service No. 53*

## Talcs for the paint industry

Now available from Compounding Ingredients Ltd of Manchester is a comprehensive data sheet on Mistron talcs suitable for use in the paint industry. These are the Mistron 75 series, Cascade 25 and Mistron Monomix.

*Reader Enquiry Service No. 52*

## Radiation curing

Technology Marketing Corporation have announced the publication of "1980 Radiation Curing Buyer's Guide". The Guide lists only the companies that verified in writing that they actually offer products and/or services to the radiation curing industry.

*Reader Enquiry Service No. 50*

# meetings, etc.

## Centenary Symposium

To mark the centenary of the Department of Colour Chemistry and Dyeing at the University of Leeds a "Centenary Symposium on Colour Chemistry" will be held on 8-10 September 1980. Further information from: the Department of Colour Chemistry and Dyeing, University of Leeds, Leeds LS2 9JT.

## Patenting strategies/management studies

The Chemical Society is holding a Review Symposium on "Patenting Strategies" in Manchester on 8-10 September 1980. Further information from: Miss L. Hart, The Chemical Society, Burlington House, Piccadilly, London W1V 0BN. A course on "Management Studies for Chemists" is also being held by the Chemical Society at Slough in Berkshire on 15-19 September 1980. Further information from: Miss L. Hart, The Chemical Society, 30 Russell Square, London WC1 5DT.

## Biennial Symposium

The Society of Dyers and Colourists will be holding their Twentieth Biennial Symposium, "Progress and Productivity in Colouration" at the University of Nottingham on 23-25 September 1981; further information from: The Editor, Society of Dyers and Colourists, PO Box 244, Bradford, West Yorkshire BD1 2JB.

## 21st Corrosion Science Symposium

The Institution of Corrosion Science and Technology, Corrosion Science Division, is holding its 21st Corrosion Science Symposium at the University of Oxford on 16-19 September 1980. Further information from: Dr J. M. Sykes, 21st Corrosion Science Symposium, Department of Metallurgy & Science of Materials, Parks Road, Oxford OX1 3PH.

## Particle size analysis/handling particulate solids

Two one-week courses are being held at the University of Bradford. "Particle Size Analysis" and "The Storage and Handling of Particulate Solids". The dates for both courses will be 22-26 September 1980. Further information from: The Secretary, School of Powder Technology, University of Bradford, Bradford BD7 1DP.

## MSc Course in Polymer Science and Technology

The Department of Physical Sciences and Technology, of the Polytechnic of the South Bank, will run a part-time course (both as a one day a week course and as a course of evening studies) in Polymer Science and Technology, commencing September 1980 and lasting 2/3 years, leading to the MSc Degree of the CNA.

The emphasis of the course is on multi-component polymer systems. Detailed consideration will be given to the scientific principles of polymer property modification in the wide range of these systems used as plastics, rubbers, foams etc.

Further information from: the Course Director, Dr R. G. Pearson at Polytechnic of South Bank, Borough Road, London SE1 0AA.

## appointments

**Roy J. de Vries** has joined the Palmco Group of Malaysia as General Manager of its new fatty acid company, Acidchem (M) Sdn Bhd, in Penang state. He was previously Managing Director of Alkaryl Chemicals (UK) Ltd.

**Mr M. G. B. Wright** has been appointed Seminar Co-ordinator, a newly created post at the Paint Research Association. Under the direction of the Training Manager, Mr L. A. Tysall, he will be

expanding the PRA's programme of seminars.

**Mr D. G. Addenbrook**, formerly Head of Marketing UK in the Ciba-Geigy pigments Division, has been appointed General Manager of the company's Water Treatment and General Chemicals Business. He is succeeded by **Mr M. A. Kerr**, who also retains responsibility for Product Management.

**Paul Denny** has been appointed Publicity Co-ordinator for the Croda Polymers Group. This will involve co-ordinating the PR and advertising functions of the various divisions within that sub-group.

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

## Obituaries

### Sidney Clifford

George Copping, author of *The History of OCCA 1918-1968*, writes: I admired Sydney Clifford, and enjoyed his jovial, very friendly, manner. He must have been of great assistance to OCCA in its early, formative days. In the 1920's he was called upon to give help and advice. At that time, a suggestion was put forward to combine the existing Paint and Varnish Society and OCCA, to be called the "Institute of Paint and Varnish Technologists". A Provisional Council was elected and Sydney Clifford was one of those who represented OCCA. Alas, when members of OCCA were balloted, few bothered to vote. Out of a membership then of, 200-250, only 62 voted, so the idea was abandoned.

Sydney Clifford had served OCCA well in the 1920's in two capacities. First he combined the dual offices of honorary secretary and honorary treasurer, but in 1930 he asked to be relieved of the office of treasurer. *JOCCA*, in recording this, said the continued growth of the Association "was due, in no small measure, to Mr Clifford". He remained honorary secretary, but finally relinquished that office too.

My contact with him was at the annual gatherings of past honorary officers. There I found him charming. He always had a ready smile, and with it came a warmth that I always will cherish.

G.C.

### A. H. McEwan

Alan McEwan died in Auckland on 22 May 1980, at the age of 64. For the 26 years he was in New Zealand and for seven years before that in Sydney, Australia, he was an active member of the Oil and Colour Chemists' Association. In 1954 Alan came to New Zealand to set up a resin manufacturing plant for his company, A.C. Hatrick, at Tawa in Wellington and in 1961 he was elected to the Board of Australian Chemical Holdings Ltd. Since 1954, until the time of his retirement in December 1979, he has

guided his company to the eminent position it holds in New Zealand with its widespread operations, now mainly in the Auckland provincial area.

From the time of his arrival in New Zealand, he was an enthusiastic member of the New Zealand Section. In 1962 Alan became the second Chairman of the Wellington Section. Because of his foresight he saw the need for an annual function to be organised alternately by the two New Zealand Sections, from this beginning has developed the New Zealand OCCA Convention. It all began with a combined committee meeting in 1962 at Wairakei, which, under his guidance, decided to hold regular annual conventions, with the first one organised by the Auckland Section in 1963.

Because of the growth and changing accent of the operations of his company, Alan transferred to Auckland in 1970, at the same time transferring his membership to the Auckland Section of OCCA. From 1969 to 1971 he served as the New Zealand Vice-President on the National Council of OCCA. In 1972 he received the Commendation Award, sponsored by the Wellington Section, in recognition of his service to the Oil and Colour Chemists' Association in New Zealand.

Alan McEwan was held in the highest regard by all those who had the pleasure of knowing him in both industry and OCCA. He is sadly missed by his many friends.

Sincere sympathy is extended to his widow, Harrie, his daughter, Maureen and her family.

T.W.S.

### Mr J. G. Leadbetter

Graham Leadbetter, Vinyl Products' Northern Area Sales Representative to the paint and building industries, died tragically on 14 May 1980. He was fatally injured while staying in London for the OCCA-32 Exhibition. Mr Leadbetter, who was 41, had been with Vinyl Products for a relatively short time, but was a well-known and respected figure in

## news

**Mr Robin Gooch** has been appointed Managing Director of Bush Boake Allen, the flavours and fragrances division of Albright and Wilson.

## OCCA news

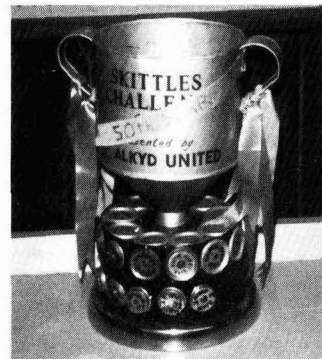
the paint industry through his previous employments, notably with Laporte Industries Limited. He was educated at Stand Grammar School, Manchester, and gained a BSc at the University of Manchester. He later became a graduate of the Plastics Institute in Polymer Chemistry. During the 1970's he served as Social Secretary of the Manchester Section of the Oil and Colour Chemists' Association.

Mr Leadbetter leaves a wife and three daughters, to whom the condolences of his friends within both Vinyl Products and the industry have been extended.

## Bristol Section

### Annual Skittles Match

The annual skittles match between the Bristol Section and the Birmingham Section took place on Friday 9 May at the Skittle Alley of BP Chemicals Ltd, Stroud, when about 60 members and their wives and friends attended.



The "unique" Alkyd Cup for skittle Matches

# OCCA news

It was a most successful and enjoyable evening and for the first time for some years the Bristol Section won the cup with some help from Birmingham. This was the 35th time that the cup had been played for and the cup has been duly decorated to note the 50th year of the Birmingham Club.

## Presentation to Mrs E. N. Harper

At an informal social gathering on 9 May 1980, Mrs Eileen Harper was presented with a Papermate pen and pencil by Berger, Hengrove Site and Operations Manager, Mr Dennis Kreter.

In making the presentation, Mr Kreter thanked Mrs Harper for her work for the Bristol Section of OCCA, not least for her period as chairman. He commented that not only had she served the usual two years in office, but had agreed to serve for an additional period. This latter period caused by a resignation through illness of the elected chairman. He also said that his particular pleasure in making this presentation was that all previous presentations made by him had been to retiring employees. In this instance Eileen was staying with the company.

Eileen has been employed in the Berger laboratories for 28 years.

J.R.T.

## Newcastle Section

### The British Titan Cup

The nineteenth annual tournament for



The photograph shows the Newcastle Chairman, John Clark (right) presenting the trophy to Brian Robinson



The President of the Birmingham Paint, Varnish and Lacquer Club (Mr. J. N. Hitchin) presenting the Cup to Mr. Les Brooke Chairman of the Bristol Section watched by Mr. G. H. Tennant, a former President of the BPVL Club

The British Titan Cup was played on Friday afternoon, 23 May 1980, at Bishop Auckland Golf Course.

This is the first time that the competition has been held at this very beautiful course. Twenty-one people competed for the trophy which was won for the first time by Brian Robinson of Berger Resinous Chemicals; previous winners Colin Morris and Norman Buchanan were pressing very hard on Brian's heels.

H.F.

## Manchester Section

### AGM

The 56th Annual General Meeting of the Manchester Section was held at the Lancashire County Cricket Club, Old Trafford on Friday 18 April, 1980 and the formal proceedings commenced at 6.30 p.m. This year's agenda under the Chairmanship of Tony Jolly and in the

presence of our President Francis Smith was one involving many changes due to retirements. The new appointments made related to the Honorary offices of Secretary, Technical Liaison Officer, Programmes Officer, Social Secretary and were filled by Alan Peters, Eric Hurst, Elizabeth Stretton and David Wilcox respectively. Two vacancies on Committee from three nominations were filled by Messrs. G. Eastwood and S. White.

A vote of thanks to retiring Committee Members and Officers was given by Jack Mitchell a past Chairman of the Section.

The dinner was initially followed by Tony Jolly's announcement that Norman Seymour, the Sections Honorary Treasurer, was the proud recipient of an OCCA Commendation Award in recognition of his conscientious service to OCCA at various Sections. Norman replied to the Chairman in both accepting the Award and relating some experiences of his long association with OCCA.

This year's after dinner speaker was Canon J. R. Smith, MA, Rector and Dean of Bury, a town famous for both black pudding manufacture and being the headquarters of the UK's largest independent paint manufacturer. In addition to his ecclesiastical duties Canon Smith is also Vice-Chairman of Bury Football Club and thus his anecdotal address varied between the graveyard and the goalmouth. He was very humorous, though it is sad to report that since the AGM the Canon's football club has dropped a division, the coup de grace being delivered by Blackburn Rovers whose ground is also in close proximity to a large paint manufacturers! Following Canon Smith, who was eager to stress the topicality of his initials; various members, often regarded as both incorrigible and delinquent, digressed into the time proven Manchester Section pastime of Liar Dice to conclude the 56th AGM in a vindictive vein.

F.B.W.



# Professional Grade

At a meeting of the Professional Grade Committee held on 8 July 1980, the following Ordinary Members were admitted to the categories shown. The Section to which each Member is attached is shown in brackets.

## Fellows

Anneveldt, Jan Johan Willem (*Natal*)  
Eglington, Roland Alexander (*Natal*)  
Froggatt, Joshua John (*London*)  
Reid, John Rodney Stanford (*Natal*)

## Transferred from Associateship to Fellowship

Geddes, Kenneth Raymond (*Manchester*)  
Hill, Gilbert Victor Geoffrey (*Thames Valley*)  
Mitchell, Seward John (*Midlands*)

## Associates

Kaye, Dennis David (*London*)  
Patel, Shirish Manibhai (*Ontario*)

## Licentiate

Richardson, Robert Keith (*London*)

## Courses for Licentiate

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 Licentiate 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.

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

## Ordinary Members

DARRAGH, KENNETH JAMES, Damar Coatings Ltd, PO Box 2030, Tauranga, New Zealand. (*Auckland*)

DOW, WARREN STUART, 9 Trimmer Tce., Papatoe, Auckland, New Zealand. (*Auckland*)

HARBOUR-COOPER, JEREMY, Gestetner Manufacturing Ltd, Research Laboratories, Fountayne Road, Tottenham, London N17. (*London*)

KEEN, ROGER DOUGLAS, Mobil Oil (NZ) Ltd, PO Box 1709, Auckland, New Zealand. (*Auckland*)

MAYER, GREGORY DOUGLAS, MSc, 101 Te Atatu Road, Te Atatu South, Auckland 8, New Zealand. (*Auckland*)

SINCLAIR, EWAN PILLANS, Charles Tennant & Co. Ltd, 214 Bath Street, Glasgow G2 4HR (*Scottish E. Branch*)

REID, DAVID CHARLES, BSc, 64 Tidal Road, Mangere, Auckland, New Zealand. (*Auckland*)

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# OCCA news

**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.

**Langley College of Further Education**, Station Road, Langley, Slough SL3 8BY. Mr L. H. Smith, Head of Applied Sciences Department.

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

**Slough College of Higher Education**, Wellington Street, Slough SL1 1YG. Mr H. Bray.

# new members

## Associate Members

HALL, PETER RONALD, ICI Ltd, Piccadilly Plaza, Manchester M60 7JT. (*Manchester*)

JOBERT, RAYMOND, 18 Rue de Breau, 77240 Cesson, France. (*Gen. Overseas*)

PEARSON, PHILIP JOHN, 35 Croydon Road, Mt. Eden, Auckland, New Zealand. (*Auckland*)

VAN ZYL, JAN JURIE, PO Box 37, Turua Via Thames, New Zealand. (*Auckland*)

CROOKS, THOMAS A., BSc, Cabot Carbon of Canada Ltd, Suite 218, 45 Sheppard Avenue East, Willowdale, Ontario M2N 5X1. (*Ontario*)

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# OCCA-33 Exhibition

28-30 April 1981

Cunard International Hotel  
Hammersmith, London W6

## THE INTERNATIONAL FORUM FOR THE SURFACE COATINGS INDUSTRIES



Motif designed by Robert Hamblin

### General information

Following the success of OCCA-32 the Exhibition Committee of the Oil and Colour Chemists' Association is pleased to announce the arrangements for the 33rd Annual Exhibition which will be held from the 28-30 April 1981 at the Cunard International Hotel, Hammersmith, London W6.

Exhibitors and visitors to OCCA-32 found that the Cunard International Hotel offered Exhibitors a wide choice of types of exhibiting facilities, as well as the services to both exhibitors and visitors which a first-class hotel can.

The main part of the Exhibition will, once again be in two sections. The entrance to the Exhibition will be on the ground floor in the new Exhibition Hall, in which exhibitors of heavy machinery, plant and equipment or those wishing to have the traditional style of stand will be situated. **For OCCA-33 it is intended to arrange for a licensed bar to be available in the New Hall.**

On the first floor, additional exhibitors, mainly of raw materials, laboratory equipment or other small exhibits, will be accommodated in the Queen Mary Suite, in which the stands will be of a modular design. The Queen Mary suite is a large pleasant room which is decorated and carpeted as an integral part of the hotel.

Access between the two Exhibition areas will be through the intermediate Mezzanine floor, on which a small number of rooms will be available for exhibitors to display free standing exhibits.

In addition, 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 in the main halls.

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.

### 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 New Hall showed that visitors to the Exhibition were drawn from the following countries.

Australia, Austria, Argentina, Belgium, Canada, Chile, Cyprus, Denmark, Ecuador, Eire, Fiji, Finland, France, East and West Germany, Greece, Hong Kong, Hungary, India, Iran, Iraq, Italy, Japan, Jordan, Malaysia, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, USA and Venezuela.

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	13.86
Management	18.96
Section Head	
Group Leader	4.27

Chemist/Physicist/Technologist	20.45
Lab Assistant/Technician	7.88
Sales & Marketing	16.38
Buyers	3.13
Administration/Secretarial	4.10
Lecturer/Student	0.81
Other	3.82
Cards not completed	6.34

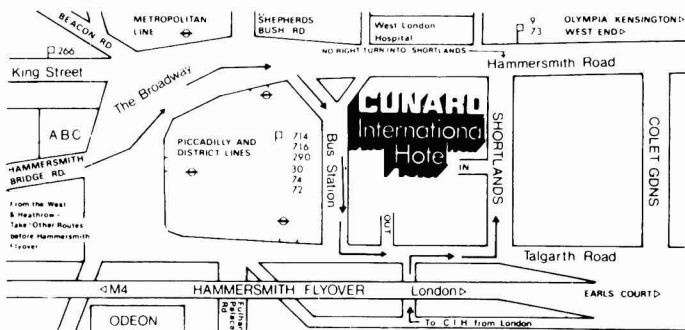
### Dates and times

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

Tuesday 28 April 1981 . . . 09.30 to 17.30  
 Wednesday 29 April 1981 09.30 to 17.30  
 Thursday 30 April 1981 . . . 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.



## Invitations to Exhibit

Invitations to Exhibit, giving details of the various types of exhibition facilities which will be available at OCCA-33 are now being prepared and sent out together with application forms, to those companies who have exhibited at previous OCCA Exhibitions or have requested information for OCCA-33. 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.

# Section Programmes for the 1980-81 session

## Main Association Events

### 1981

**Tuesday 28 – Thursday 30 April** OCCA-33 Annual Exhibition at the Cunard International Hotel, Shortlands, Hamersmith, London W6.

**Wednesday 17 – Saturday 20 June** OCCA Conference to be held at the Beaufort Hotel, Bath.

**Friday 19 June** Annual General Meeting to be held at the Beaufort Hotel, Bath, *details to be announced.*

Members attached to Sections and Branches are sent reminder notices before each meeting. Members wishing to attend a meeting of another section are reminded that meetings may be subject to alteration and reference should be made to the Forthcoming Events feature published each month in the *Journal* and to the appropriate Hon. Secretary.

## Bristol

Unless otherwise stated, all meetings will be held at the Royal Hotel, Bristol, commencing at 7.15 p.m.

### 1980

**Friday 19 September** "The present state of water thinnable resins for the surface coatings industry" by G. Keith, Rohm & Hass (UK) Ltd, (Joint meeting with the Birmingham Paint Varnish & Lacquer Club) to be held at the Royal Hotel.

**Friday 31 October** Ladies' Evening, *details to be announced.*

**Friday 28 November** "Pigments", D. Austin, Sun Chemical Corporation, *details to be announced.*

### 1981

**Friday 30 January** "Paint Specifications", acceptance procedures as they affect the Paint Industry by R. L. J. Morris, Materials QAD.

### 1980(8)

**Friday 27 February** "Evaporation and Solvent Power of Solvents" by B. Hudson of BP Chemicals.

**Friday 27 March** Ladies' Night, *details to be announced.*

**Friday 24 April** Annual General Meeting, *details to be announced.*

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

## Hull

Unless otherwise stated, all meetings will be held at the Queens Hotel, George Street, Hull commencing at 6.45 p.m.

### 1980

**Friday 3 October** Annual Dinner Dance to be held at the Willerby Manor Hotel, Willerby, Hull, *details to be announced.*

**Monday 6 October** "Handling and Process Control in a Paint Factory" by H. Houben of TBMA Holland. Joint meeting with S. Humberside Chemical Engineers Association to be held at the Humber Bridge Hotel, Bolton-on-Humberside, S. Humberside.

**Monday 3 November** "Marketing in the Paint Industry" by L. F. McCulloch of Blundell-Permoglaze Ltd.

**Monday 1 December** "Appreciation and Application of Microprocessors" by H. Dempsey, Senior Lecturer, Hull College.

### 1981

**Monday 5 January** "The Paint Tin" by Mr. J. B. Welburn/Mr. Holmes of Metal Box Ltd.

**Monday 2 February** "The Maintenance and Protection of North Sea Structures" by F. M. Small of Berger (UK) Ltd.

**Monday 2 March** Ladies' Evening, *details to be announced.*

*Hon. Secretary:* C. Goodall, LRIC, AIWM, Harlands of Hull Ltd, Land of Green Ginger House, Anlaby, Hull HU10 6RN

## Irish

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

### 1980

**Friday 6 June** Golf outing, Skerries Gold Club, *details to be announced.*

**Friday 19 September** "Safe Transport and Handling of Chemicals" by D. Fitzgerald, FICI.

**Friday 24 October** "Latest British Standards" by F. Timmons, sponsored by ICI Ireland Ltd.

**Friday 7 November** Annual Dinner Dance, to be held at the Clarence Hotel, Dublin, commencing at 8.30 p.m.

**Friday 5 December** "Pigmentation of White Printing Inks" by T. Entwistle of BTP Tioxide Ltd.

### 1981

**Friday 23 January** Open Forum – Panel from Paint/Printing Ink Industries and IIRS.

**Friday 20 February** Ladies Evening, *details to be announced.*

**Friday 20 March** "Timber Preservation" by A. Hilditch, Technical Director, Cuprinol Ltd.

**Friday 17 April** Annual General Meeting, *details to be announced.*

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

## London

### 1980

**Thursday 25 September** "Vehicle Refinishing", by a speaker from Berger Paints, at the Princess Alice, Romford Road, Forest Gate, E7, commencing at 6.15 p.m. To be followed by a buffet supper.

**Wednesday 22 October** "A lone-eyed view of the last half century of paint" by J. J. Froggatt, at the Rubens Hotel, Buckingham Palace Road, SW1, commencing at 7.00 p.m.

# OCCA news

**Friday 7 November** Ladies' Night to be held at the Selsdon Park Hotel, Sandstead, Surrey, commencing at 7.00 for 7.30 p.m.

**Wednesday 12 November** "Plastics & Paints against Corrosion". A one-day joint symposium with the Plastics & Rubber Institute, at the Thames Polytechnic, Woolwich, SE18, commencing at 10.00 a.m.

## 1981

**Thursday 15 January** "Hydrocarbon Solvents" by A. M. Cumbers, of Carless Solvents Ltd, at the "Princess Alice", Romford Road, Forest Gate, E7, commencing at 6.15 p.m. To be followed by a buffet supper.

**Thursday 17 February** "Surface Character and Performance of Organic Pigments" by Dr R. R. Mather, of Ciba-Geigy Pigments & Additives Co. Joint meeting with the Society of Chemical Industry. At the SCI, 14 Belgrave Square, SW1 commencing at 6.00 p.m.

**Wednesday 18 March** "Applications of Colour". Joint one-day symposium with the Society of Dyers & Colourists, London Region, at the Thames Polytechnic, Woolwich, SE18, commencing at 10.00 a.m.

**Thursday 23 April** Annual General Meeting at the 'Princess Alice', Romford Road, Forest Gate, E7 commencing at 6.30 p.m. followed by a lecture of general interest to which members' ladies are invited. *Details to be announced.*

*Hon. Secretaries:* B. F. Gilliam ATSC, 25 Regency Close, Chigwell, Essex, IG7 5NY. (Tel. 01-534 3311 (Business) 01-501 1210 (Home).  
A. C. Saxby, 15 Morley Hill, Stanford-le-Hope, Essex. (Tel. Erith (Kent) 32555 (Business).

## Manchester

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

## 1980

**Wednesday 10 September** Golf Tournament at Stockport Golf Club.

**Friday 19 September** Student Seminar "Industrial Finishes - The Present and the Future", commencing at 10.00 a.m.

**Friday 10 October** Lecture "Plastics for Buildings - 13 Years on" by B. Wade of Leeds Polytechnic, commencing 6.30 p.m.

**Friday 17 October** Annual Dinner Dance, at the Piccadilly Hotel, Manchester. *Details to be announced.*

**Monday 10 November** Lecture "Formulation of Lead Free Paints" by W. Kelch of BASF Ltd, Woodcourt Hotel, commencing at 6.30 p.m. *Details to be announced.*

**Wednesday 19 November** Student Lecture "Pigment Packing and the Optimum Use of Extenders" by Manchem Ltd, commencing 4.30 p.m.

**Friday 12 December** Lecture "Solvent Based Masonry Paints" by Goodyear Ltd, commencing 6.30 p.m.

## 1981

**January** Joint Lecture with the Institute of Printing. *Details to be announced.*

**Wednesday 21 January** Student Lecture "Pigments for Printing Inks" by Dr J D Sanders of Ciba-Geigy Ltd Plastics & Additives, commencing at 4.30 p.m.

**Friday 13 February** Lecture "Computer Match Prediction" by Dr I Bridgman of Ciba Geigy Ltd, commencing at 6.30 p.m.

**Wednesday 18 February** Student Lecture "Woodpriming Paints" by Messrs F. Redman and W. Phillips of Crown Paints Ltd, commencing 4.30 p.m.

**Monday 9 March** Lecture "Medials" by Manchem Ltd, at Crest Motel, Bolton, commencing at 6.30 p.m.

**March** Student Works Visit. *Details to be announced.*

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

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

*Hon. Secretary:* A. E. Peters, BSc, c/o Mrs G. Latchford, ICI Ltd, Sunley Building, Piccadilly Plaza, Manchester M60 7JT.

## Midlands

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

## 1980

**Thursday 25 September** "Future Litho Plate Developments" by J. Ling of Coates Brothers Ltd, joint with Printing Institutes.

**Friday 26 September** Ladies' Night Dinner Dance at the Botanical Gardens, Edgbaston.

**Thursday 16 October** "Powder Coatings" by L. Whitfield of BIP Ltd.

**Thursday 20 November** Student Lecture "General Corrosion Protection" by E. V. Carter of Miox Ltd.

## 1981

**Friday 16 January** Dinner Lecture at Chamber of Commerce and Industry,

Birmingham. "Automotive Paints - Views of a user and a manufacturer." M. Kelly of BL Ltd, and R. Tennant of Carrs Paints.

**Thursday 19 February** "Pretreatment for Paint" by M. Danks of W. Cannings Materials Ltd.

**Thursday 19 March** Newton Friend Ladies' Invitation at Chamber of Commerce and Industry, Birmingham. "National Trust" by Mr Harrison of the National Trust.

**Saturday 25 April** Annual General Meeting.

*Hon. Secretary:* E. C. Wallace, 192 Comberton Road, Kidderminster KD4 54Z.

## Trent Valley Branch

Unless otherwise stated, all meetings will be held at the Derby Crest Motel, Pasture Hill, Littleover, Derby, commencing at 7.15 p.m.

## 1980

**Thursday 9 October** "Iron Oxides and their production over the past 150 years" by Mr S. N. Hawley of W. Hawley & Son Ltd.

**Friday 31 October** Halloween Buffet and Dance at the Cross Keys Inn, Turnditch. *Details to be announced.*

**Tuesday 11 November** "Recent technical developments in chlorinated rubber paints" by G. Humphreys of ICI.

## 1981

**Friday 16 January** Joint dinner lecture with the Midlands Section on "Automotive Paints".

**Thursday 12 February** "Dispersants - Theory and Practice" by Dr R. D. Harding of Bevaloid Ltd.

**Thursday 12 March** "British Rail Specifications - What, Why and How" by Dr F. G. R. Zobel, Head of Surface Coatings Laboratories, British Rail.

**Friday 10 April** Annual General Meeting followed by Buffet Dance at the Cross Keys Inn, Turnditch. *Details to be announced.*

*Hon. Secretary:* S. Watson, 21 Delamere Drive, Mansfield, Notts. NG18 4DE.

## 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.

## 1980

**Thursday 2 October** "Maintenance and Protection against Corrosion of North Sea Structures", by F. M. Small, Berger.

**Thursday 6 November** "Some training considerations for R & D". Mr C. Murray, CAPITB.

**Thursday 4 December** "The Impact of Recent Legislation on Health and Safety Aspects of Paint Products and Processes", by D. Howe, Toxicological Advisor, Paint Makers Association of Great Britain.

## 1981

**Thursday 8 January** "Stability of Pigment Dispersions", by Dr M. Jaycock, Loughborough University.

**Thursday 5 February** "Industrial Relations in the Paint Industry", by J. E. McLoughlin and P. Hooper, Berger.

**Friday 20 February** Ladies Night at the Five Bridges Hotel, Gateshead. *Details to be announced.*

**Thursday 5 March** "A Hundred Years of Colour Chemistry", by Prof. Rattee, Colour Chemistry Dept, University of Leeds.

**Thursday 2 April** Annual General Meeting. *Details to be announced.*

*Hon. Secretary:* S. Lynn, CChem, MRIC, 19 Waskerley Close, Sunnyside, Newcastle upon Tyne.

## Scottish

Unless otherwise stated, all meetings will be held at the Albany Hotel, Glasgow, and will commence at 6.00 p.m.

## 1980

**Thursday 9 October** "Searching for Oil in Alaska" by J. R. Taylor, BSc, FRIC, FTSC.

**Thursday 13 November** Joint Lecture with Society of Dyers and Colourists, Albany Hotel, Glasgow, at 7.30 p.m. "Effluent Problems" by W. G. Warwick, BSc, Project Engineering Manager, Ciba-Geigy P & A Company. "Toxicology" by J. Craig, Product Safety Executive, Ciba-Geigy Paints & Adhesives Company.

**Thursday 11 December** "The use of Liquid Colourants and Additives" by J. Hastings-Lang, Croda Chemicals Ltd.

## 1981

**Thursday 15 January** Advances in The Development of Water-Borne Printing Inks for Major Printing Processes", by Dr C. Armstrong of Coates Brothers Ltd, Murrayfield Hotel, Edinburgh at 7.30 p.m.

**Thursday 12 February** "Water-Borne Systems" (a) Industrial Finishes by Toxide International, (b) Wood Finishes by Hill Sen. & Wallace.

**Thursday 12 March** "Pigments" Film and Lecture, Lecturer from BASF Ltd.

**Thursday 9 April** "Glasgow Theatres Behind the Scenes" by D. Smith of Ault & Wiborg Ltd. *Details to be arranged.*

*Hon. Secretary:* Mrs A. McA. Gibson, Alexander Fergusson & Co. Ltd, 59 Ruchill Street, Glasgow 20 (Tel. 041-946 2101).

## Eastern Branch

Unless otherwise stated, all meetings will be held in the Murrayfield Hotel, 18 Corstorphine Road, Edinburgh commencing at 7.30 p.m.

## 1980

**Friday 17 October** Annual Skittles Match, in the Carousel Inn, 145 Ferry Road, Edinburgh.

**Wednesday 19 November** "Organic Pigment Developments for the Printing Ink and Paint Industries" by Adrian Abel, of Hoeshst (UK) Ltd. It is hoped to arrange a light buffet at this function.

## 1981

**Thursday 15 January** "Advances in The Development of Water-Borne Printing Inks for the Major Printing Processes" by Dr C. Armstrong of Coates Bros. This meeting will be held in the Maybury Roadhouse, Maybury Road, Edinburgh, and is a joint Scottish Section/Eastern Branch Meeting.

**Friday 20 February** Annual "Burns Supper" in the Commodore Hotel, Marine Drive, Edinburgh. *Details to be announced.*

**Wednesday 11 March** "Line Measurement of Colour" by Dr Ferguson of Instrumental Colour Systems. This is organised by BP & BIF Scottish District, and will be held in the King Malcolm Hotel, Dunfermline, at 7.30 p.m. to which all interested persons are invited.

**Wednesday 15 April** Annual General Meeting followed by "Innovations in Wallcovering" by George Niven, Development Manager, Nairn Coated Products.

*Hon. Secretary:* A. R. Van Spall, Croda Inks Ltd, 170 Glasgow Road, Edinburgh.

## Thames Valley

Unless otherwise stated, all meetings will be held at the Beaconsfield Crest Motel (White Hart), Aylesbury End, Beaconsfield, Bucks, commencing at 6.30 p.m. for 7.00 p.m.

## 1980

**Thursday 2 October** "Modern Coatings a curse or a blessing" by D. A. Bayliss of BIE (Anti-Corrosion) Ltd.

**Thursday 6 November** "Application methods and in particular automatic systems" Lecture and Films - DeVilbiss Co. Ltd.

**Thursday 4 December** "Marketing practice at home and abroad" by R. L. T. Bickers, Visiting tutor, International Marketing Staff College, Henley.

## 1981

**Thursday 22 January** Works visit. *Details to be announced.*

# OCCA news

**Friday 6 February** Annual Buffet Dance to be held at "Great Fosters", Egham, Surrey.

**Thursday 19 February** "Truflex coatings for tennis court surfacing" by B. R. Wynne of R. J. Hamer & Sons Ltd.

**Thursday 19 March** "Developments in Building Chemicals and Compositions" by Dr Maurice Wilkinson of Blundell Permoglaze Ltd.

**Thursday 9 April** Annual General Meeting "Talk - Tourism around the Thames" by Thames & Chiltern Tourist Board.

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

## West Riding

Unless otherwise stated, all meetings will be held at the Mansion Hotel, Roundhay Park 8, commencing at 7.30 p.m. Would Members please note that Meetings will take place on the 1st Tuesday in every month.

## 1980

**Tuesday 2 September** "West Riding Chairman's Lecture" by M. G. Bentley. *Details to be announced.*

**Tuesday 7 October** "Chip Dispersions - Manufacture and Uses" by F. J. Morpeth of Foscolor Ltd.

**Tuesday 4 November** Lecture by a speaker from Shell Chemicals (UK) Ltd. *Details to be announced.*

**Friday 28 November** West Riding Ladies' Evening Dinner and Dance to be held at the Crown Hotel, Harrogate.

**Tuesday 2 December** "Colour Measurement and Surface Coatings" by Dr D. A. Plant.

## 1981

**Tuesday 3 February** Lecture on "Some Aspects of Micro Processors". *Details to be announced.*

**Tuesday 3 March** "Colour Systems" by G. Pakvis and L. Wehrens of Tenneco Colortrend BV.

**Tuesday 7 April** Annual General Meeting.

*Hon. Secretary:* T. Wood, BSc, MRIC, 26 Kingstonia Gardens, Ripon, N. Yorkshire. (Tel: Home Ripon 4241 - Business Morley 534423.)

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**Paint**  
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# The Paint Industry Today: World Trends

by Shun'ichi Nakanishi (Kansai Paint Company)

Translated from the J. Japan Soc. Colour Mat. 1978 Vol 51 No. 3, 155-94

This article is probably the most comprehensive yet concise account of the world paint industry which has so far been published. It was written originally in Japanese and, in view of the widespread interest in the subject and the high cost of individual commissioned translations, the Paint R.A. arranged for translation and publication of the article so that it can reach a wide range of readers.

The article surveys the paint industry in all countries for which it has been possible to obtain information. These comprise countries of the Far East, including the People's Republic of China, of the Near and Middle East, Brazil, countries of Africa and Oceania, and of Eastern and Western Europe. Much of the statistical information on the Eastern countries has been compiled by the Japanese External Trade Organisation and has not been previously accessible in a European language. The information on the Western world is from more common sources but there is a difference in the commentary; it is the industry of the Western world as seen through Eastern eyes.

This article will be invaluable to anyone with an interest in international trade, or anyone who wishes to know which countries import most of their paint, which have their own paint industry, and which are the competing exporters. Even for those without commercial interest, the article is fascinating reading, and the standard of translation is extremely high.

**Price: £20.00** (Paint RA Members: £10)

Available (prepayment only) from: Information Department, **Paint Research Association**, Waldegrave Road, Teddington, Middlesex TW11 8LD.

## CLASSIFIED ADVERTISEMENTS

Classified Advertisements are charged at the rate of £5.00 per single column cm. Advertisements for Situations 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).

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### Association Ties

The Association single motif tie is once more available for members from the Association's office and can be obtained with either a navy blue or a maroon background.

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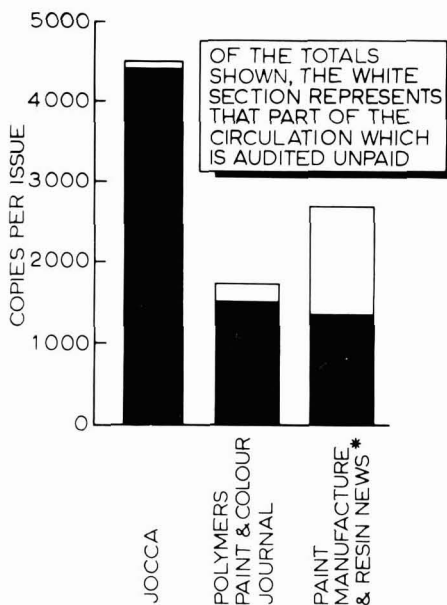
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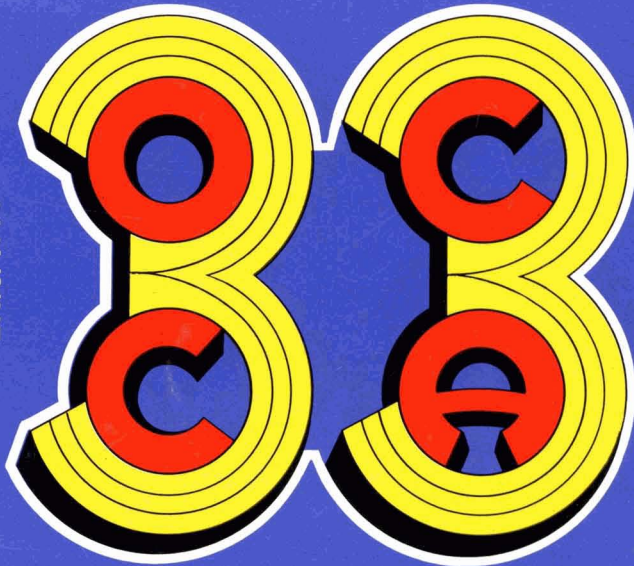


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