

1910
Educational (190) Department.

ORDINARY MS.

G.O., No. 37

DATED 24 — 1 — 10

[Despatch Abstract.]

Report by a Govt Technical Scholar —

Recording report by V. Govindan Nayar
a Govt Technical Scholar in England,
who visited the International Congress
of Applied Chemistry.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

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CURRENT FILE.

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PAPERS PUT UP WITH CURRENT No. _____

Papers of the department to which the current belongs.

Number.	Date.	Original (=O.) or spare copy (=S. C.)	Remarks. (In this column such of the papers as have been removed for copying, printing, etc., should be marked with a cross.)	Initials of Referencer with date in token of return to Reference department.

Papers of other departments.

Department.	Number.	Date.	Original (=O.) or spare copy (=S. C.)	Despatcher to note the return of the papers to the departments concerned.

To 655 his H. P. No. 67 ✓
21/12/09
Regd 10-1-10.



No. 16

Report by a Government technical scholar ,
who visited the International Congress of Applied
Chemistry, forwarded, in original, to the Government
of Madras for information, in continuation
of the Home Department endorsement no. 979, dated the
2nd December 1909.

By order,

Home Department.

(Education)

Calcutta, the 6th January 1910.

Deputy Secretary to the Govt. of India.

[Signature]

TR
10/1



J. H. Reynolds Esq., M. Sc.,
Principal,
Municipal School of Technology
Manchester.

Manchester.
17 June 1909.

Dear Sir,

With reference to your letter of the 27th May 1909, I beg to state that I attended the International Congress of Applied Chemistry and as desired by you a brief report of its sectional meeting at which I was present is herewith appended. Apart from the purely academic interest attached to the congress I have the pleasure to inform you that much benefit has been derived by having seen, heard and talked to some of the great Scientists of the world.

I remain,
yours faithfully,
V. G. Nair.



Report by a Government technical scholar who visited the International Congress of Applied Chemistry, forwarded, in original, to the Secretary for information, in continuation of the Home Department endorsement no. 979, dated the 2nd December 1909.

By order,

Home Department.
(Education)

Calcutta, the 10th January 1910.
Deputy Secretary to the Govt. of India.

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Report on proceedings of Sections IV B and IV A of the
International Congress of Applied Chemistry, 1909.

The congress commenced its sittings in Sections on Friday the 28th May and ended on Tuesday the 1st June. On the 28th I attended Section IV B, "Colouring Substances and their uses", on the 29th attended Section IV A, Organic Chemistry, on 31st and 1st June, attended Sections IV A and IV B and also Section II, Inorganic Chemistry for a paper on "Fused Silica Ware". The following is an abstract of some of the more important papers discussed in Sections IV B and IV A.

In Section IV B, the proceedings opened with a paper on the Reactions between Dye Solutions and Inorganic substances. It was demonstrated that a layer of sand (silica) will hold back the colouring substance in a dye solution. For that purpose, a dye solution of Night Blue was slowly passed through a 5-inch column of purified and ignited sand and it was noticed that the colourless liquid only passed through while the dye was retained in the upper layers of the sand. This action is more marked in the case of basic dyes than "direct" dyes. In the discussion that followed it was asked whether the composition of sand was previously ascertained, whether it contained any silicate as mere ignition cannot be relied on to get the sand in the pure state as SiO_2 . It was stated that in America this reaction of sand is being largely taken advantage of in the manufacture of certain pigments which are fast to light and to lime. In his reply Mr.

Davis stated that the action of sand was a purely physical one though at first sight it may not appear to be so.

The nature of Dye-stuffs in aqueous solution.

It is regarded that dye stuffs of high molecular weight, particularly the direct cotton colours, exist in solution as colloids and that they are converted into non-colloidal compounds by means of mordants. The examination of the electrical conductivities of aqueous solutions of these substances showed that they behave as normal electrolytes being highly dissociated in weak solutions. The determination of their molecular weight by the boiling point method also indicated that ionic dissociation was taking place. There is therefore evidence to show that these substances, Benzyl-purpurine H B, Erika B &c. are non-colloidal in character.

Decolorising action of various forms of Charcoal. Animal charcoal removes pure colouring matters, that is to say, charcoal can be dyed. The decolorising action of charcoal is most probably due to the presence of organic nitrogenous compounds which are stable at a red heat, as evidenced by the difference in the action of various forms of charcoal, such as animal charcoal, coconut charcoal, lamp black, acetylene black, &c. The more closely the substance approaches in composition to pure carbon, the less is its decolorising action. It is therefore highly probable that absolutely pure amorphous carbon, however fine its state of division, will be found to be devoid of any decolorising

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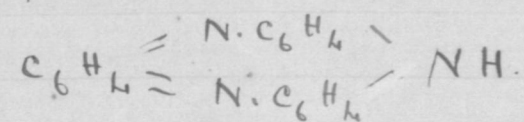
action on either acid or basic dye-stuff. The absorption of colouring matters by animal charcoal is therefore no evidence to show that dyeing is only a mechanical process. The fact that the colours taken up are in proportion of their molecular weights shows that chemical action is at work.

Synthetic Indigo.

The natural and synthetic indigos are chemically the same; in application also they are similar. The application of indigo is based on the reduction of indigo white. There are various methods for this reduction, the chief being by fermentation and by chemical ingredients. Experiments have shown that hydrosulphite vats are advantageous.

Chemical Technology of Aniline Black.

The author states that the oxidation products of aniline are Emeraldine, nigraniline and Ungreenable Black. These three are contained in variable proportions in commercial Aniline Blacks. Nigraniline can be readily ~~reconverted~~ converted into Emeraldine by sulphurous acid whilst ungreenable black is only reduced by hydrosulphites. The "greening" of ordinary Aniline Blacks by acids is explained by the reduction of Nigraniline into Emeraldine, while at the same time as a result of the foregoing reduction a portion of the nigraniline is oxidised to quinone. Dr Emeraldine Prof. Green ascribes the following formula



deduced from its behaviour on oxidation and reduction, the analysis of its hydrochloride and its stability to acids.

The fibres are invariably tendered by the use of chlorates in the dyeing of "aged" aniline blacks. This is due to the formation of oxycellulose. In order to obviate this it is suggested to replace this oxidising agent by atmospheric oxygen. This has been successfully effected by making use of the observation that a small quantity of para-diamine constitutes when associated with cupric chloride a catalytic system by which aniline can be readily oxidised by air alone into Emeraldine and even into Ungreen-able Black. The presence of alkaline chlorides in the solution assist the reaction. The action of these chlorides seems to be one of concentration and not of oxidation. Besides leaving the material stronger, the above process is cheaper on account of the better utilisation of the Aniline.

Colouring matter of Red Sanderswood.

Santalin is the colouring matter in red sanderswood. Different formulae have been assigned to it by different investigators. Dr. Cain's researches showed it to be $\text{C}_{15}\text{H}_{14}\text{O}_5$. It was extracted from the wood by ether, and purified through the lead salt. It was then obtained in microscopic needles having

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a melting point of 215° . Slightest impurity lowers the melting point to 104° .

Ciba and ~~Ciba~~ Cibanone Colours.

These are some of the new colours brought on the market by the Society of Chemical Industry in Basle. The Ciba colours represent some new members of the indigo or thio-indigo group and the Cibanone colours are derivatives of anthraquinone.

Paranitrosomethylbenzylamine

This is a new intermediate product from which a large number of dye-stuffs can be prepared. This new dye-stuff may be called Methylene Blue M.E. It dyes tannin mordanted cotton in shades which are much greener than those produced by ordinary methylene blue.

Organic ChemistryIndia rubber in North America.

To concentrate on special lines has been the practice in America as regards India rubber industry. The utilisation of rubber waste by its conversion into a plaster rubber compound nearly as good as the same compound before vulcanisation is carried on to a great extent in America. This is done by the separation of the three varieties of rubber, viz. α , β and γ varieties, by means of suitable solvents. The quality of rubber depends on the amount of the α variety contained in it.

Action of Caustic Soda lye on Cotton.

It is supposed that caustic soda forms a definite compound with cellulose when the latter is treated with it. Gladstone was the first to investigate on it and he found that about 2-3 per cent of caustic soda was taken up by the fibre. This corresponds to the formula $C_6H_{10}O_5 \cdot NaOH$ as given by Gladstone. The researches of Mr. Hübner show that caustic soda does not form any chemical combination with cellulose. Gladstone did not take into consideration the structure of the cotton fibre and that caustic soda can be retained within the capillary tubes of the cotton fibre. In the researches of Mr. Hübner it was found that even after long washing with alcohol, the fibre still retained some free caustic soda. The absorption of caustic soda was found to be constant between

89
20 and 30' Sw. The mercerising action of the cotton fibre was suggested to be due to the hydration of the fibre.

The effect of the addition of salt to the caustic soda lye has been investigated and it is found that substances such as water glass, salt, glycerine &c. retard the effect of mercerisation.

Action of Oxalic acid on Cellulose.

It is known that if a strong solution of oxalic acid, thickened with British gum, is printed on calico and allowed to dry at the ordinary temperature, and the calico be then well washed, the printed parts, while not being tendered, exhibit a marked affinity for methylene blue and a decreased affinity for direct colours like Erika. Tartaric and citric acids do not show this behaviour. Investigation showed that this is due to the decomposition of oxalic acid, a formyl cellulose being formed. Malonic acid acts similarly yielding acetyl cellulose. It appears probable that all the acids of this series will behave similarly and that a new mode of formation of acidic derivatives of cellulose is thus rendered available.

Gaseous Compounds of Carbon and Nitrogen other than Cyanogen.

The author states that it is probable that a gas of the formula, CNO , osane, exists in which one oxygen of carbon dioxide is replaced by nitrogen. This

gas has a density of 1.8. There should also
be a gas, monocyanogen, CN , in which
the oxygen of carbon monoxide is replaced
by nitrogen.

[E. & L.]
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EDUCATIONAL DEPARTMENT.
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NOTES.

C. No. 67 From the Govt of I. No. 16, dated 6-1-1910.

SUBJECT.

Report by a Govt Scholar in England.

The Govt of I. forward, in original, for the information of this Govt. the report by V. Govindan Nayar, a Govt technical scholar, who visited the International Congress of Applied Chemistry.

2. V. Govindan Nayar was awarded a State technical Scholarship in G.O. no. 426 Ed & 1-6-1908 for the study of textile Chemistry as applied to the dyeing, bleaching, finishing & printing of textile fabrics.

3. The report may be recorded. The draft below is for approval.

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17-1-10.

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To ^{under} ~~the~~ Secy.

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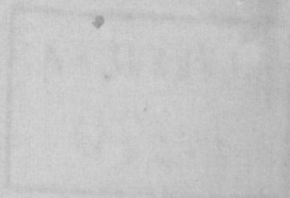
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Rea. No. 270 A/69-1
21-1-10.



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21 JAN 1910

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The draft of a form, in original, for
the information of the Secy. the report of
V. Gordon Wray, a local technical school,
who visited the Educational Council of
Applied Chemistry.

V. Gordon Wray was awarded a
State Technical Scholarship in 1908 for the study of technical chemistry
as applied to the dyeing, bleaching, finishing &
printing of textile fabrics.

The report may be recorded. The draft
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