

## The Application of the Neolan Dyestuffs in Wool and Silk Printing

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On the occasion of the 1925 Colourists Congress in Zürich, Prof. Dr. Ruggli of Basle gave a paper on Neolan dyestuffs which was, however, owing to the position of the series existing at that time and the limited expe-

riences gained by then, confined entirely to the dyeing of Wool. As is well known, this series of dyestuffs is chiefly used for Wool, particularly for the dyeing of fast shades on Loose Wool, Slubbing, Yarn and Piece and

that a special characteristic of the class is the necessity for the use of a somewhat stronger acid bath than usual in dyeing.

Ruggli has already mentioned that the dyeing of Neolan dyestuffs takes place in two phases, the Dyeing and the Development. Since 1925, the Neolan range of dyestuffs has been considerably extended and the Society of Chemical Industry in Basle has, at the same time, investigated the possibilities of their application in other directions. From a close study of their behaviour in the dyeing of Silk, it has been established that entirely different conditions obtain with this fibre than is the case with Wool. In the first place it was discovered that by dyeing with organic acids such as Acetic or Formic, the Neolan Colours gave on Silk shades which are particularly fast to Light, Washing and Water. Development of the ultimate shade and fastness as a secondary phase has not been observed. Another notable characteristic found, is that in contrast to other classes of dyestuffs, the Neolan Colours dye both Pure and Weighted Silk the same or practically the same depth of shade. Furthermore they exhibit good level dyeing properties on weighted Silk.

The successful results obtained in Silk dyeing led to experiments in the printing of Silk with Neolan Colours. From this branch of the trade there is a constant demand for faster colours. Hitherto, the fastest effects in Silk printing were only obtainable with Vat Colours which mostly lacked brilliance and further the application from a Potash printing colour was not always regarded with favour. Printing with Chrome Printing Colours, while generally producing effects of good fastness, leaves a harsh "feel" or handle on the material. A study of the behaviour of the Neolan Colours in the printing of Silk showed that in this case, the Chrome in its particular form of combination, did not exercise any unfavourable effect while the printed effects so produced were perfectly fixed and could be described as of excellent fastness to Light and Washing. Hitherto, in the production of heavy "Blotches" no tendency to "bleed" had been observed. It is noteworthy that the Neolan Colours can be printed without or with only a small addition of Acetate of Chrome and except for somewhat of an increase in the fastness to Water in the latter case do not exhibit any appreciable differences.

The following printing instructions give an idea of the method of applying the Neolan

Colours in Silk Printing. The same recipes can be used for the printing of Chiné. It should be mentioned that the addition of Organic Acids to the printing colour is not necessary and are preferably omitted, as certain Neolan Colours, i. e. Neolan Green B and BL conc. and Neolan Dark Green B do not develop in presence of Acid. If Acetate of Chrome is used an addition of Ammonium Tartrate 32° Tw. is also recommended.

*Printing Recipe I without Chrome.*

10— 30 gr. Dyestuff are dissolved in  
400 cc. boiling water, stirred into  
600 gr. hot British Gum Thickening 1 : 1,  
boiled up and stirred until cool.

*Printing Recipe II with Acetate of Chrome.*

10— 30 gr. Dyestuff are dissolved in  
350 cc. boiling water, stirred into  
600 gr. hot British Gum Thickening 1 : 1,  
and stirred until cold, then add  
25— 40 cc. Acetate of Chrome 32° Tw. and  
5— 10 cc. Ammonium Tartrate 32° Tw.

While in general from 5—30 gr. Dyestuff per kilo is sufficient for colours, in the case of Neolan Blacks printed with 60 gr. dyestuff per kilo, an addition of 30—60 cc. Acetate of Chrome 32° Tw. and 10 cc. Ammonium Tartrate 32° Tw. is recommended.

After printing, steam for 1 hour without pressure, wash and finish as usual. Shorter steaming as a rule is not conducive to complete fixation of the Neolan Colours.

Latterly an increasing amount of Spray Printing is being done on silk for which the same recipes may be used, omitting only part of the Thickening.

The following Neolan dyestuffs are suitable for the printing of Silk:

Neolan Yellow G, GR and R,  
" Orange G and R,  
" Pink B and G,  
" Red R,  
" Bordeaux R,  
" Blue B, BR, G, 2G, GR and 2R,  
" Green B and BL conc.,  
" Dark Green B,  
" Brown GR and GRA,  
" Violet Brown B,  
" Violet R,  
" Black B and 2R.

THE PRINTING OF WOOL with the various classes of dyestuffs is governed by similar conditions as the printing of Silk. In

Woollen piece printing, Chrome colours are not often used as also in this case the addition of Chrome Salts has a tendency to produce a harsh "feel" on the goods. The work is therefore confined largely to Basic, Direct and Acid Colours, with consequently the production of effects of inferior fastness. As in Silk printing, the use of colours not capable of being completely fixed also produces the possibilities of "marking off" or "bleeding" of heavy Blotches. Vat Colours have been tried, they are printed from a Potash printing colour and yield very fast results. At the same time they exhibit the fault, that the end effect i. e. the complete development, is difficult to attain.

For these reasons there has also existed in the Woollen printing trade, a demand for a class of dyestuffs which could be applied either with or without a small addition of Mordant to yield printed effects fast to Light, Washing, Water, Perspiration etc., and at the same time show no tendency to "mark off" or "bleed" in heavy Blotches. The trials showed that this was possible with Neolan Colours and led to the following recipes being suggested. The steaming in this case, evidently produces complete development which in dyeing is only attained by an energetic boiling in presence of an increased amount of Acid. The addition of Chrome is not absolutely necessary but at the same time a small addition improves somewhat the fastness to Water. The addition of Acid is also omitted.

*Printing Recipe I without Chrome.*

10— 30 gr. Dyestuff are dissolved in  
400 cc. boiling water, stirred into  
600 gr. hot British Gum Thickening  
1 : 1, and boiled up. Add  
70 gr. Glycerine and stir of Chrome.

*Printing Recipe II with addition of Chrome.*

10— 30 gr. Dyestuff are dissolved in  
290 cc. boiling water, stirred into  
600 gr. hot British Gum Thickening  
1 : 1, and boiled up. Stir until cold  
and add  
50 gr. Glycerine and  
60 cc. Acetate of Chrome 32° Tw.

Print on, dry and steam moist for 1 hour. Wash and finish as usual.

The Neolan dyestuffs suitable for Wool printing are the same as given in foregoing list for Silk printing.

Recently there has been a revival of interest in Vigoureux printing and the application of the Neolan Dyestuffs in this branch of the trade has therefore been studied. The fastness requirements in Vigoureux printing differ from those in Woollen piece printing as Slubbing is a prior stage of manufacture and the processes of Spinning, Weaving and often Milling have to be taken into consideration. Generally the Slubbing is spun into either Hosiery or Weaving Yarns. In the first case the goods are not subjected to a Fulling process while in the second case severe Milling is given, which demands a corresponding fastness in the dyed shades. For Vigoureux printing for the production of the ordinary Knitted fabric and Ladies Dress Goods a good selection of dyestuffs is available which exhibit good fastness to Light. Latterly, however, there has arisen a demand for fast to Light, Washing, Water and Perspiration effects for Tricot, Dress Goods etc. Trials made with Neolan printed Slubbing showed that unexpectedly fast results were obtained which were suitable for fast tricot fabrics and even for the best quality Dress materials. For this latter article, Chrome colours were hitherto chiefly used. The Neolan Colours, however, exhibit equally fast and brighter shades without any difficulties of fixation. When using Chrome colours, fixation is only attained by the addition of Acetate of Chrome, Fluoride of Chrome, Chromaline etc., according to the dyestuff in question. For the fastest effects a large addition of Chrome Salt is usually required which often leaves a "harsh" feel on the Slubbing. The Neolan Colours can be printed either with or without Chrome and even in the former case, the Chrome Salt addition is only small, thus lessening the danger of any adverse effect on the material.

The Recipes for Vigoureux printing with Neolan Colours are very similar to those suggested for Woollen piece. As Slubbing can carry somewhat more Chrome, the amount may be increased as given in the following recipe. At the same time it should be understood that the necessary fastness is also attained without the addition of Chrome and the Backwashing bath remains clear.

*Printing Recipe with slightly increased addition of Chrome Salt.*

10— 60 gr. Dyestuff are dissolved in  
300 cc. boiling water, stirred into

500 gr. hot British Gum Thickening  
1 : 1, boiled up and stirred until  
cold. Then add  
40 gr. Glycerine and  
20—100 cc. Acetate of Chrome 32° Tw.

After printing, wrap in cloth and steam in a moist condition. One hour's steaming at  $\frac{1}{4}$  atm. pressure will be found sufficient. If a pressure steamer is not available, the steaming can be carried out in an open Steam Chest. Should it be necessary, for technical reasons to dry after printing, the use of moist steam is advisable. After steaming, the Slubbing is passed through the Back-washer in which the first bath should contain lukewarm water while the second and third are used for soaping and washing respectively, finally drying and melanging in the Gill-box.

## DISCHARGE PRINTING

### *A. Silk*

Following the demonstration of the fact that shades of excellent fastness to Light, Washing and Water could be produced on Silk with Neolan colours, the question of the dischargeability of such dyeings naturally arose. It is well known that Mordant dyestuffs which have been fixed with Chrome are only dischargeable in very pale shades as the Chrome on the fibre leaves a greyish impurity in the whites. The addition of Ammonium Tartrate, Citrate or Oxalate to the discharge printing colour effects only a slight improvement. It is therefore rather interesting to record that dyeings of the peculiar Chrome combination represented by the Neolan class of dyestuffs can be easily and completely discharged with Hydrosulphite preparations. As the printer well knows, one general recipe for discharge printing on Silk cannot be used in every case without some modification as the Tin-Phosphate weighting, where weighted Silk pieces come into question, exercises an influence on the dischargeability. It has been shown that weighted pieces can only be discharged with a printing colour containing Zinc Oxide.

The preparation of a printing colour which gives good results on weighted Silk piece is as follows:

450 gr. Gum Thickening 1 : 1,  
400 gr. Hydrosulphite RWS Ciba,  
150 cc. Water.  

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1 Kilo.

(The addition of Zinc Oxide can be reduced or omitted entirely in the discharging of Pure or slightly weighted Silk.)

After steaming in the Mather & Platt, wash and finish as usual. Coloured discharges can be produced in the usual manner with Basic, Acid or Chrome colours.

The following Neolan dyestuffs are suitable for dyeing ground shades for discharge work:

Neolan Yellow G and R,  
,, Orange G and R,  
,, Brown GRA,  
,, Violet Brown B,  
,, Pink B and G,  
,, Red R,  
,, Bordeaux R,  
,, Violet R,  
,, Blue B, BR, G, 2G, GR and 2R,  
,, Green B and BL con.,  
,, Dark Green B,  
,, Black B and 2R.

### *B. Wool*

For discharge printing on Woollen piece, selected Acid colours have hitherto chiefly been used, special consideration being paid to their level dyeing properties, as the material is mostly chlorinated. It has now been established that the Neolan colours on Wool are in most cases dischargeable with Hydrosulphite preparations. The Chrome occurring in the Neolan complex does not interfere with the production of a satisfactory white discharge which, apparently, would indicate that the Chrome on the fibre exists in some different form of combination than is the case with ordinary Mordant colours. With Neolan dyestuffs it is now possible to dye shades fast to Light, Washing, Water and Perspiration on which can be produced discharge styles of the highest degree of fastness, hitherto not possible with ordinary Acid colours.

The recipes for the preparation of discharge printing colours are similar to those in general use for wool. The White discharge colour contains an addition of Zinc Oxide or Hydrosulphite preparation containing Zinc Oxide.

The following general recipe yields good results on full dyed grounds:

230 gr. Gum Thickening 1 : 1,  
500 gr. Hydrosulphite RWS Ciba,  
130 gr. Glycerine,  
100 cc. Albumen Solution 1 : 1.  

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1 Kilo.



According to the depth of shade, the amounts of Hyrosulphite preparation and Albumen can be reduced.

Coloured discharges are made up as usual for discharge printing on Wool with Basic or Acid dyestuffs.

The following Neolan dyestuffs are recommended for the dyeing of ground shades for discharge work:

- Neolan Yellow G and R,
- „ Orange R,
- „ Brown GRA,
- „ Violet Brown B,
- „ Red R (only in pale shades),
- „ Bordeaux R,

- Neolan Violet R,
- „ Blue 2R,
- „ Green B and BL conc.,
- „ Dark Green B,
- „ Black B.

The foregoing only purports to be a short description of the application of the Neolan Colours in direct Printing and Discharge styles on Silk and Wool in which perforce all possibilities could not be outlined. Further Work done in the practical application of the Neolan Colours in the print works will perhaps allow to form a definite opinion on the application of the Neolan Colours in Printing of Wool and Silk.