## Letters to the Editor.

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### The Transmission of Ultra-violet Light through Tracing Cloth.

DURING an investigation of the effects of ultra-violet light on various types of blue print paper, it was found that ultra-violet light from a quartz mercury vapour lamp passed through ordinary commercial tracing cloth (or linen) to an extent both unexpected and surprising. A number of tracing cloths were obtained, and spectrograms were taken with three seconds exposure using a Hilger quartz spectrograph.

Specimens of various types of paper were also tested in a similar manner, and the results are shown in the photographs reproduced (Fig. 1), and in the accompanying tables.

TRACING CLOTHS.

| No. | Type of Screen. | Approximate thickness in mm. | Mesh count per cm. | U.-V. Limit in Ångström units. |
|---|---|---|---|---|
| | None | .. | .. | 2225 |
| A | Excelsior | 0·070 | 44 × 44 | 2535 (faint) |
| B | Imperial | 0·070 | 47 × 47 | 2535 |
| C | Excelsior | 0·083 | 47 × 47 | 2535 (faint) |
| D | Imperial | 0·081 | 43 × 43 | 2482 |
| E | Lion | 0·080 | 41 × 41 | 2482 |

PAPERS.

| No. | Type of Screen. | Approximate thickness in mm. | U.-V. Limit in Ångström units. |
|---|---|---|---|
| | None | .. | 2225 |
| P | Newspaper | 0·070 | 3984 |
| Q | Kraft paper | 0·101 | 4339 (faint) |
| R | Wrapping paper | 0·077 | 3125 |
| S | Writing paper | 0·069 | 3125 |

Thickness and the number of meshes to the centimetre do not seem to have much importance; the material itself seems to be translucent to ultra-violet

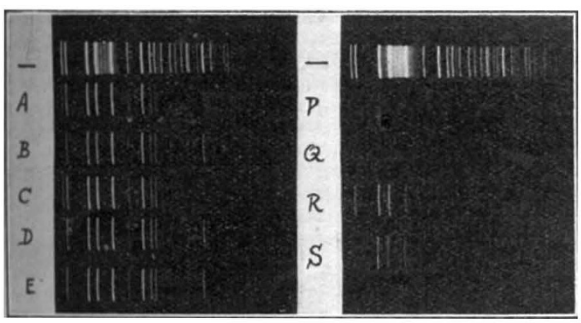


FIG. 1.

light. On the other hand, experiments made with thermopile and galvanometer showed that the heat from the sun or from a red-hot ball passed through the tracing cloth to a much less extent than through glass or vita glass.

Herein may lie the usefulness of this discovery, because, whether in sunlight or in artificial ultra-violet light, it is now possible to screen off much of the heat and yet retain most of the ultra-violet. A single layer of tracing cloth, between wide-meshed wire screens, can now replace curtains or blinds, and with this screen before an *open* sunny window it is possible to enjoy the advantages of ultra-violet light without undue heat or glare, although the eyes should be protected. Moreover, for country cottages, chicken farms, etc., it is now possible to obtain a cheap and effective substitute for the many glasses which have been manufactured to secure ultra-violet light in the more beneficial regions of the spectrum.

C. H. YOUNG.

McGill University,
Montreal, Nov. 22.

### A New Band System of Carbon Monoxide.

IN an attempt to photograph the so-called spurious bands associated with the third positive carbon bands, on a 21-ft. concave grating, my plates showed a band at λ3893·2 which was completely resolved under the dispersion. I could also see some bands at λλ3681·1, 4125·0, and 4380·3. Good plates of these bands were obtained in the first order of the grating. The band at λ3681·1 is completely mixed up with one of the spurious bands beginning at about λ3694, and those at λλ4125·0 and 4380·3 are to a more or less extent similarly mixed up with the Ångström bands at λλ4123 and 4393 respectively. On the other hand, the band at λ3893·2 is completely isolated. The fine structure analysis of this band was therefore easily achieved. It has been possible also to analyse the fine structure of the bands at λλ4125·0 and 4380·3, since the structure of the superimposed Ångström bands is definitely known. No attempt has yet been made to analyse the band at λ3681·1 as the structure of the spurious band superposing it is not known.

It has been possible to arrange these bands as follows:

| $n'$ \ $n''$ | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| 0 | 27158·0 (H)<br>(3681·1)<br>27165·5 (*o*) [1] | 25678·7 (H)<br>(3893·2)<br>25686·2 (*o*) | 24235·6 (H)<br>(4125·0)<br>24243·1 (*o*) | 22823·4 (H)<br>(4380·3)<br>22830·8 (*o*) |

[1] Calculated.

The final state is thus identical with that of the Ångström bands. Fine structure analysis proves the correctness of this arrangement, the (0 – 1), (0 – 2), and (0 – 3) bands having identical $F''(j+1) - F''(j)$ values with those for the respectively similar Ångström bands.

Each band consists of one $P$, one $R$, and one $Q$ branch, the latter being about twice as strong as either of the other two. One $R$ line and one $Q$ line are missing, and the transition is clearly $^1S \longrightarrow {}^1P$, the latter level being identical with that of the Ångström system. The initial level is about 5000 $\nu$ higher up than the initial level of the Ångström bands, and is thus identical with the new level at 91923 $\nu$ recorded by Birge (*Phys. Rev.*, **29**, 922; 1927). The new level is clearly shown by the present bands to be an $^1S$ level, and therefore the bands are very probably due to the transition $3^1S \longrightarrow 2^1P$, if the Ångström bands are $2^1S \longrightarrow 2^1P$.

The fact that the new system has only one $n''$ progression is noteworthy. The Ångström system has the $n' = 0$ progression well pronounced, but in addition possesses the first two members of the $n' = 1$ progression. The third positive carbon bands and the