The formal treatment of the photochemical scavenger kinetics results in the dependence of the quantum yield, φ, on scavenger concentration $[S]$, over a range of concentrations according to:

$$\varphi = \varphi_r + a\Phi \sqrt{[S]} \quad (8)$$

where, as shown in Fig. 1, in the present case the residual quantum yield in the absence of scavenger, φ_r, equals zero. a is a parameter representing the probability of recombination between the solvated electron and its parent ion. Increasing a points to an increased probability for the solvated electron to escape and react with the scavenger. The slopes of the straight lines in Fig. 1, obtained from experiments with phosphate, together with the values of the maximum quantum yield, Φ, obtained from experiments with N_2O, show that at 254 mμ in the charge transfer band the maximum quantum yield reaches its highest value; but at the same time the probability of recombination between the solvated electron thus formed and the parent ion is also at its highest. At higher quantum energies the maximum quantum yield for solvated electron formation decreases somewhat, but the probability that the solvated electron once formed escapes recombination with its geminate partner increases somewhat. These results point to the possibility of investigating the characteristics of the photochemical 'cage'.

It is to be emphasized that in the sequence of reactions 1–4 the absorbing species, ferrocyanide in the present case, is not consumed and serves as a catalytic mediator for the light-induced dehydrogenation of the alcohol.

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BIOCHEMISTRY

Heat-yellowing of Wool and Silk

Previous work on the heat-yellowing of wool has been summarized by Howitt[1]. Neither the amino-acids responsible for the phenomenon, nor the reactions involved, have been elucidated, and an attempt has, therefore, been made to solve these problems by studying the action of heat on untreated and chemically modified wools. The general principle was to modify different side-chains and cross-linkages in turn, and then to compare the extent of yellowing of the untreated and chemically modified wools after heating for 24 h in a slow stream of dry air or nitrogen at 150° C, the yellowness indices of the samples being determined by a procedure similar to that of Norton and Nicholls[2]. Using iodinated wool and wool methylated with diazomethane it was shown that the tyrosine side-chains of wool play little part in heat-yellowing under the foregoing conditions; but no satisfactory way of discovering the part played by the hydroxylic side-chains of serine and threonine could be devised. As silk is rich in these amino-acids, and as methylation with dimethyl sulphate and alkali is permissible with this material[3], the action of heat on untreated and methylated silk was examined. The results are given in Table 1.

Table 1

Sample	Yellow index: Before heating	After heating in: Air	After heating in: Nitrogen
Untreated	1	44	11
Methylated	12	18	17

It is clear that the hydroxylic side-chains of either serine or threonine, or both, play an important part in the heat-yellowing of silk, and, presumably, wool. Recent work by Norton and Nicholls[4] suggests that threonine plays little part in heat-yellowing, but the importance of serine is confirmed by the fact that it promotes the N → O peptidyl shift, which appears to be crucial in the only method of acetylation[5], among the many we have examined, that is capable of minimizing the heat-discoloration of wool.

We thank the International Wool Secretariat for grants in aid of this investigation.

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Scopoletin, Scopolin and Chlorogenic Acid in Tumours of Interspecific *Nicotiana* Hybrids

Phenol and certain substituted phenolic compounds were reported recently to be co-carcinogenic in animal tissue[1]. The investigation of phenolic compounds in tumorous plant tissue of *Nicotiana* hybrids is of great academic interest in that much is known of the genetic background[2,3], cytology[4], chemical composition[5] and the effects of radiation[6] and of certain anti-tumour chemicals[7] on the tumorous plant. Some of these compounds are known to take part in alkaloid metabolism[8].

Certain interspecific combinations of *Nicotiana* are known to produce tumours spontaneously[2]. Materials used in the work recorded here were *N. glauca* Grah., *N. langsdorffii* Weinm., *N. suaveolens* Lehm., 2*n* and 4*n* (*N. glauca* × *N. langsdorffii*) and 4*n* (*N. suaveolens* × *N. langsdorffii*). New tumours were green or white in colour, and when older they gradually turned brown or grey.

Composite material from the same group of test plants was used for analysis. Tumours were separated by the location of their growth, and by their age. Extractions were made immediately after gathering in a Waring blender at room temperature (22 ± 2) Each 30 g of fresh material was extracted twice with 120 ml. of 70 per cent ethanol, allowing 7 min for each extraction. Additional ethanol was used for washing. Combined ethanol fractions were diluted with an equal volume of water and extracted with ethyl ether to remove pigments.

The ethanol fraction was filtered, concentrated *in vacuo*, and then made up to a 30 per cent methanol solution. This solution was fractionated with a polyamide resin 'Ultramidpulver' column. Three main zones were detected with ultra-violet light (3660 Å) and were eluted separately: fraction 1, a blue-fluorescing front zone containing scopolin; fraction 2, a non-fluorescing zone; and fraction 3, an intense blue-fluorescing zone containing scopoletin.

Identification of scopoletin. The scopoletin (6-methoxy-7-hydroxycoumarin) fraction was first concentrated *in vacuo* to dryness at room temperature, using a rotary evaporator, by azeotroping the water with isopropyl