Prof. Wilska's letter should be useful in directing the attention of microscopists to the value of amplitude-contrast and central dark-ground illumination in some cases. His photographs show that excellent results can be obtained by very simple means.

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[1] Wilska, A., *Nature*, **171**, 353 (1953).
[2] Oettlé, A. G., *J. Roy. Micr. Soc.*, **70**, 232, 255 (1950).
[3] Barer, in "Contraste de Phase et Contraste par Interférences" (Paris: *Revue d'Optique*, 1952); *J. Roy. Micr. Soc.*, **72**, 10, 81 (1952); and in the press.
[4] Bennett, A. H., Osterberg, H., Jupnik, H., and Richards, O. W., "Phase Microscopy" (Wiley, New York, 1951).
[5] Zernike, F., *Physica*, **9**, 686, 974 (1942).

WITHOUT criticizing the vector treatment of amplitude and phase-contrast microscopy kindly given by Dr. Barer in his comment on my letter[1], I would like to make the following comments: (1) Using my second method, phase-advancing objects appear darker than the background. The soot layer appears to cause a considerable phase retardation in addition to the absorption. (2) If the absorbing annulus is made substantially darker, the resulting image becomes peculiarly glossy and too unsharp to be of any value. Thus the "central dark-ground illumination" does not seem to be very promising in this connexion. (3) According to Oettlé[2], as well as from my own observations, ordinary negative phase-contrast methods do not produce images comparable with those of positive phase-contrast in clarity. The inherent haziness and glare of the negative phase-contrast picture may be due entirely to the light reflected from the phase plate and converged back to the area under observation. Due to the reflectivity of absorbing annuli evaporated by ordinary means, this additional surface illumination may reach higher values than the light passing the objective annulus. My method does not suffer from this in the same degree since the reflectivity of soot is small.

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[1] Wilska, A., *Nature*, **171**, 353 (1953).
[2] Oettlé, A. G., *J. Roy. Micr. Soc.*, **70**, 232 (1950).

Ability to smell Solutions of Potassium Cyanide

IT has been known for many years that some individuals are unable to smell hydrogen cyanide, and the possibility that this inability may be genetically controlled was mentioned at a recent conference on the origin and evolution of man[1]. A short time ago our attention was directed again to this phenomenon, and we have since used a simple method of ascertaining the frequency of the inability to smell hydrogen cyanide among the white population of Australia and carried out a preliminary study of the mode of inheritance of this character.

The sample of the adult population comprised 244 individuals ranging in age from sixteen to sixty. The method of testing finally adopted consisted of presenting alternately tubes containing respectively 5 ml. distilled water and 5 ml. 20 per cent potassium cyanide soaked into cotton-wool. The tubes were stoppered between tests. Fresh tubes were made up at the beginning of each day. Subjects were asked to state if they could smell anything in either tube. Those that could were classified for the strength of their response on a subjective five-point scale. Independent observers achieved similar results using this method. Subjects whose response was doubtful or negative were retested after a rest of several minutes. Non-smeller individuals were retested in nearly all cases on subsequent days.

There is a striking difference between the sexes in the incidence of non-smellers when this method of testing is used, 24 out of 132 males, and 5 out of 112 females being unable to distinguish the cyanide tube from that containing distilled water. Of the remaining individuals tested, 31 males and 26 females could distinguish the smell from the potassium cyanide tube only faintly, but all were able to pick out the correct tube when retested. All the other subjects could distinctly and immediately recognize a smell in the tube containing the cyanide, though the nature and strength of the response varied considerably from person to person. The proportion of non-smeller males and females suggests that the inability to smell is a sex-linked recessive. The observed frequency of females (4·46 per cent) corresponds closely with what would be expected (3·33 per cent) from the observed number of males (18·2 per cent) if sex-linkage were operating. The difference between the frequency of the recessive gene calculated from the number of non-smeller males and that calculated from the number of non-smeller females does not differ significantly from zero when tested by the method of Snyder[2].

In an attempt to examine further the possibility of sex linkage, we have tested 61 families containing two or more children older than ten years. The 122 parents of these children are included in the larger sample of 244 individuals discussed above. Table 1 gives the number of smellers and non-smellers among the offspring in various mating groups.

Table 1

Group	No. of families	Parents		Children			
		Males	Females	Male		Female	
				S.	N.S.	S.	N.S.
1	45	Smeller	Smeller (expected)	53 (48)	4 (9)	54 (54)	0 (0)
2	12	Non-smeller	Smeller (expected)	11 (11)	2 (2)	13 (13)	3 (3)
3	4	Smeller	Non-smeller (expected)	2 (0)	2 (4)	4 (4)	0 (0)
4	0	Non-smeller	Non-smeller	—	—	—	—
Total	61			66	8	71	3

Though the number of families tested so far does not enable a decisive answer to be given by gene frequency analysis, the results indicate that a sex-linked recessive gene is possibly involved in the control of the ability to smell hydrogen cyanide. There is a deficiency of non-smeller males in group 1 and there are two exceptions in group 3. In this latter group all male children should be non-smellers. One of these children is a very doubtful smeller, but the other has no difficulty in detecting the presence of cyanide. One explanation of such discrepancies may be the operation of other genetic factors which