The proposita, her mother and father have normal colour vision; the first two were tested on the anomaloscope and the Ishihara, the father only on the latter.

The Xg groups of the family are shown in the pedigree: because the proposita is Xg(a−) while her father is Xg(a+) it must be considered that the morphologically normal X which she has in both her cell lines is from her mother (who must be heterozygous $Xg^{a}Xg$). It follows that the presumptive isochromosome present in the cells with 46 chromosomes is of paternal origin—yet the patient is Xg(a−).

Other cases. The families of 12 other patients who have presumptive isochromosomes for the long arm of the X have been tested, but the Xg groups did not segregate in the informative way they did in the J. and R. families. The groups of these other families are recorded in Table 1: in four of the 12 patients the presumptive isochromosome appears to be of paternal origin (families Fra., All., And., Eri.; see discussion).

Table 1. TWELVE FAMILIES IN WHICH THE PROPOSITA HAS A PRESUMPTIVE ISOCHROMOSOME FOR THE LONG ARM OF THE X BUT IN WHICH THE Xg GROUPS ARE LESS INFORMATIVE THAN THOSE OF THE FAMILIES J. AND R.

Investigator	Identification	Xg groups of Father	Mother	Proposita	Brothers	Sisters
Court Brown and Whyte	Hig.*	+	+	+	−	
	Tho.*	+ c.b.	+	+ c.b.		+
Motulsky	Sea.	+	+	+		
Polani and Hamerton	Fra.	−	+	+		
	Gib.*	+	+	+	+	+
	Rog.	+	+	+	−	
Lindsten	Las.*	−	+ ‡	−	+ + +	
	All.*	−	+	+		+
	And.	−	+	+	+ +	
	Eri.	−	+	+		+
	Sjo.	−	+	−		+
	Sve.	+	+	+		

+, Xg(a+). −, Xg(a−). c.b., colour blind.
* not found to be a mosaic (XO/X iso-X).
‡ Her mother, sister and 2 brothers are all +.

Discussion. Analysis of the two families, J. and R., indicates that the presumptive isochromosome of both patients is of paternal origin. If this abnormal chromosome found in the Xg(a−) daughters consists of two long arms of the X chromosome from the Xg(a+) father then these arms do not contain the Xg locus, which should therefore be located on the short arm. (The evidence that family J. gives for the deutan locus being on the short arm has already been discussed[8,9].)

Two possibilities could upset this argument. The hypothesis of Lyon[10], which postulates that in the mouse and possibly in all mammals only one X chromosome is 'active' in any one cell, makes it theoretically possible that the isochromosomes of our two patients are 'inactive' in all cells. If this were so the Xg(a−) reactions of the two patients could merely reflect lack of gene action and would not afford evidence of the arm on which Xg is located. The fact that the isochromosome is 'hot' when labelled with ^{3}H-thymidine late in the period of DNA synthesis[4,5] indicates that it synthesizes later than the other chromosomes: whether this means that it is also 'inactive' remains to be demonstrated.

The second possibility is that the two different cell lines found in both patients might be so distributed that those producing the Xg groups have 45 chromosomes including the single, maternal, X carrying the silent *Xg* gene. In this event again the Xg locus could be on either arm of the X chromosome. However, an identical, non-random distribution of two cell lines in two unrelated individuals seems most unlikely.

Thus, though the evidence is suggestive, definite proof that the Xg locus is on the short arm of the X chromosome must await clarification of these problems.

In some of the patients, the Xg findings can help in tracing the origin of the presumptive isochromosomes, but there are certain limitations and two sets of factors have to be taken into consideration: the 'activity' or otherwise of the presumptive isochromosomes and the situation of the Xg locus on the short or long arm of X chromosomes generally. If the presumptive isochromosomes of the patients were 'inactive' in all cells, a paternal origin could be assumed in six of the 14 patients (R., J., Fra., All., And., Eri.) irrespective of the situation of the Xg locus: on the other hand, if they were 'active', one could conclude a paternal origin for the six only on the assumption that the Xg locus is on the short arm. In the two patients J. and R., 'activity' of the isochromosomes would imply that the Xg locus is on the short arm (if we disregard mosaicism), and indeed this is the object of the present article.

We thank Dr. P. M. F. Bishop, London, who referred the proposita of family R. for investigation, Dr. M. Svenmar, Rävemåla, for help in obtaining blood samples from the family J., and Prof. I. Kugelberg, Stockholm, for the colour vision investigation of that family. We also thank Dr. W. M. Court Brown, Edinburgh, Dr. E. G. Oastler and Dr. W. G. Whyte, Glasgow, and Dr. A. Motulsky, Seattle, for samples from three of the families listed in Table 1. We thank Dr. J. D. Mann, Grand Rapids, and Dr. A. Cahan, New York, for generous supplies of the anti-Xg^{a} serum.

One of us (J. L.) gratefully acknowledges a grant from Nordisk Insulinfond.

[1] Mann, J. D., Cahan, A., Gelb, A. G., Fisher, N., Hamper, J., Tippett, P., Sanger, R., and Race, R. R., *Lancet*, i, 8 (1962).
[2] Fraccaro, M., Ikkos, D., Lindsten, J., Luft, R., and Kaijser, K., *Lancet*, ii, 1144 (1960).
[3] Klinger, H. P., Lindsten, J., and Fraccaro, M. (in preparation).
[4] Muldal, S., Gilbert, C. W., Lajtha, L. G., Lindsten, J., Rowley, J., and Fraccaro, M. (in preparation).
[5] Giannelli, F. (in preparation).
[6] Lindsten, J., *Lancet*, i, 1228 (1961).
[7] Jackson, C. E., Symon, W. E., and Mann, J. D., *Lancet*, ii, 512 (1962).
[8] Stewart, J. S. S. *Lancet*, ii, 104 (1961).
[9] Polani, P. E., and Hamerton, J. L., *Lancet*, ii, 262 (1961).
[10] Lyon, M. F., *Nature*, **190**, 372 (1961).

NEWS and VIEWS

The Academy of Sciences of the U.S.S.R.: Academician V. A. Kirillin

ACADEMICIAN VLADIMIR A. KIRILLIN, director of the High Temperature Laboratory of the Department of Technical Sciences, has been elected a vice-president of the Academy of Sciences of the U.S.S.R. in succession to Academician A. V. Topchiev, who died in Moscow on December 27. Academician Kirillin is a graduate of the Moscow Power Institute, where he has taught for the past twenty years. Ten years ago he was elected corresponding member of the Academy, and in 1962 he became a full-member. He has been awarded a State Prize and a Lenin Prize for his participation in theoretical and experimental investigations of the thermal properties of water and steam. He is also chairman of the U.S.S.R. Co-ordinated Committee on the Properties of Steam.

Academician B. E. Paton

ACADEMICIAN BORIS PATON, director of the Electrical Welding Institute, has been elected a new member of the Præsidium of the Academy. He became a full-member of the Academy in 1962. Academician Paton has been working for some twenty years in the Institute, which is named after his father, Yevgeny Paton. Last year he was elected president of the Academy of Sciences of the Ukrainian S.S.R.