Table 2. Direct effect, pooled indirect effect, and total correlation of sugars, proteins, alcohol insoluble solids (AIS), and dry matter (MS) with green pea and dry seed yields in pea.

	Green pea yield[1]			Dry seed yield[1]		
	Direct effect	Pooled indirect effect	Total correlation	Direct effect	Pooled indirect effect	Total correlation
Sugars (%)[1]	.047	-.267	-.220	-.383	.106	-.277
Proteins (%)[1]	-.254	-.065	-.319	.353	-.395	-.042
AIS (%)[1]	-.051	.210	.159	.346	.024	.370
MS (%)	.421	-.004	.417*	-.105	.325	.220

[1] Dry matter basis * P = .05 ** P = .01

1. Krarup, A. 1980. PNL 12:40.
2. Pandey, S. and E. T. Gritton. 1975. Crop Sci. 15:353-356.
3. Krarup, A. 1977. PNL 9:25.

FURTHER STUDIES OF AN INTERCROSS IN PISUM

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In 1980 (5) I gave an account of my results from the application of the intercross method to L-114,T(4-6)a and L-58,T(4-6)b. In these lines the T-points are located in proximity to the centromeres with the effect that chiasmata are not formed in the interstitial segments. Under the microscope it is not possible to distinguish with certainty between the karyotypes of these lines and those of normal structural type as represented by L-110 t(cf. Fig. 1) and (1)]. However, in L-114 the T points are situated in the long arms and in L-58 in the short arms of the chromosomes involved.

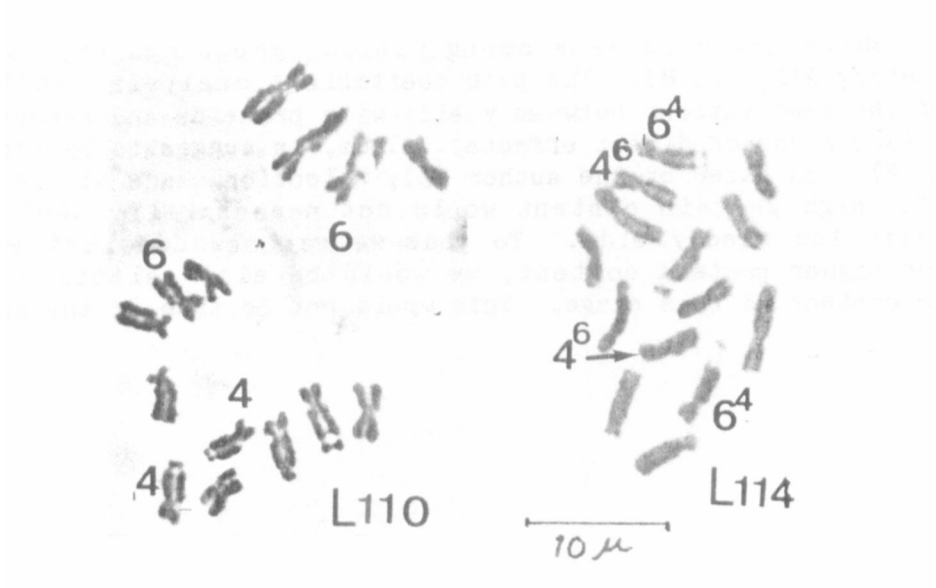

Fig. 1. Mitosis in root tips of L-110 (standard for the normal structural type) and L-114,T(4-6)a.

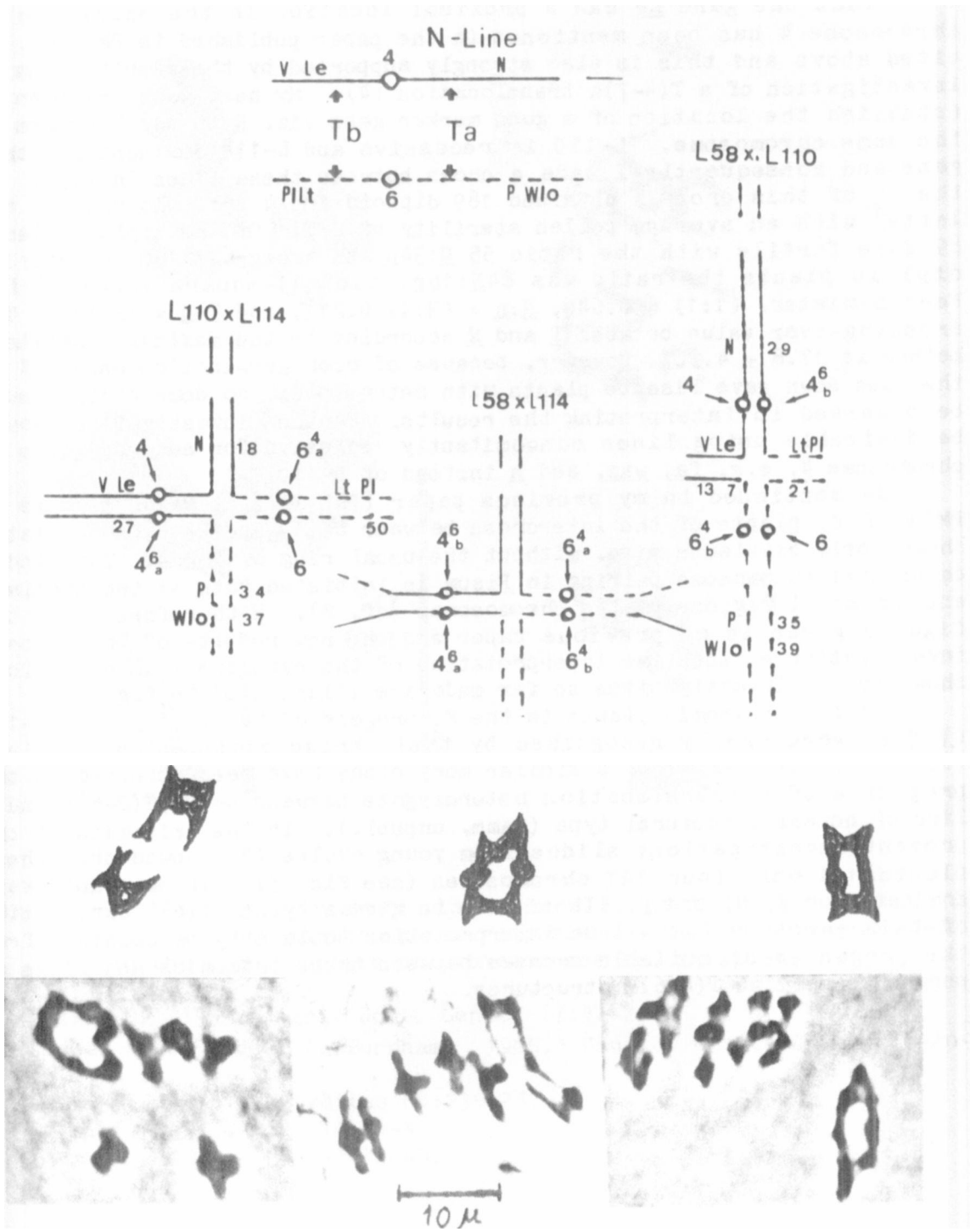

Fig. 2. Probable chromosome associations at meiosis in the translocation heterozygotes concerned. In the tentative schemes for the pairing at prophase linkage values between the T-points of and L-58 and some marker genes are noted. The bottom rows illustrate rings of four at the first metaphase.

That the gene Le has a proximal location in the short arm of chromosome 4 has been mentioned in the paper published in PNL Vol. 12 cited above and this is also strongly supported by the results from my investigation of a T(4-7)a translocation (4). My next goal has been to establish the location of a good marker gene viz. N in the long arm of the same chromosome. L-110 is recessive and L-114 dominant for this gene and consequently I made a cross between these lines in 1979. In the F_2 of this cross I obtained 189 diploid and 4 trisomic plants, the latter with an average pollen sterility of 27%. Of the diploid plants 89 were fertile with the ratio 55 N:34n and among the 100 semisterile diploid plants the ratio was 84N:l6n, the chi-square values being Fert:Semister. (1:1) = 0.640, N:*n* = (3:1) 0.213, and T-N = 12.150. The crossing-over value between T. and N. according to the maximum likelihood method is 17.8 + 4.50%. However, because of poor germination only 80% of the seed sown gave rise to plants with mature pods, so some caution must be observed in interpreting the results. Further investigations would be desirable using lines concomitantly recessive for several genes of chromosome 4, e.g. fa, was, and n. instead of L-110.

As mentioned in my previous paper (PNL 12), at MI of meiosis in PMCs of F plants of the intercross between L-114 and L-58, some plates showed only bivalents (j.e. without the usual ring of four). This indicates that chromosome pciring in Pisum is initiated both at the proximal and terminal regions of the chromosomes (cf. 2). With reference to the figures given in my previous paper and the new results of the present investigation a tentative interpretation of the cytogenetical conditions shown by the investigations so far made are illustrated in Fig. 2.

The four trisomic plants in the F progeny of L-110 (.y. n p) x L-114 (V N P) were easily recognized by their broad stipules and leaflets (Fig. 3). Trisomies of a similar morphology have been observed in the progenies of a translocation heterozygote between L-108,T(2-6)a and a line of normal structural type (Lamm, unpubl.). In the trisomies of the present investigations slides from young ovules (3) showed that these plants had only four SAT chromosomes (see Fig. 3). These plants were dominant for V, N and P. It is easy to give a hypothetical explanation of this genotype but a true interpretation could only be obtained from the progenies of suitable crosses between these trisomies and lines of normal as well as T(4-6)a structures.

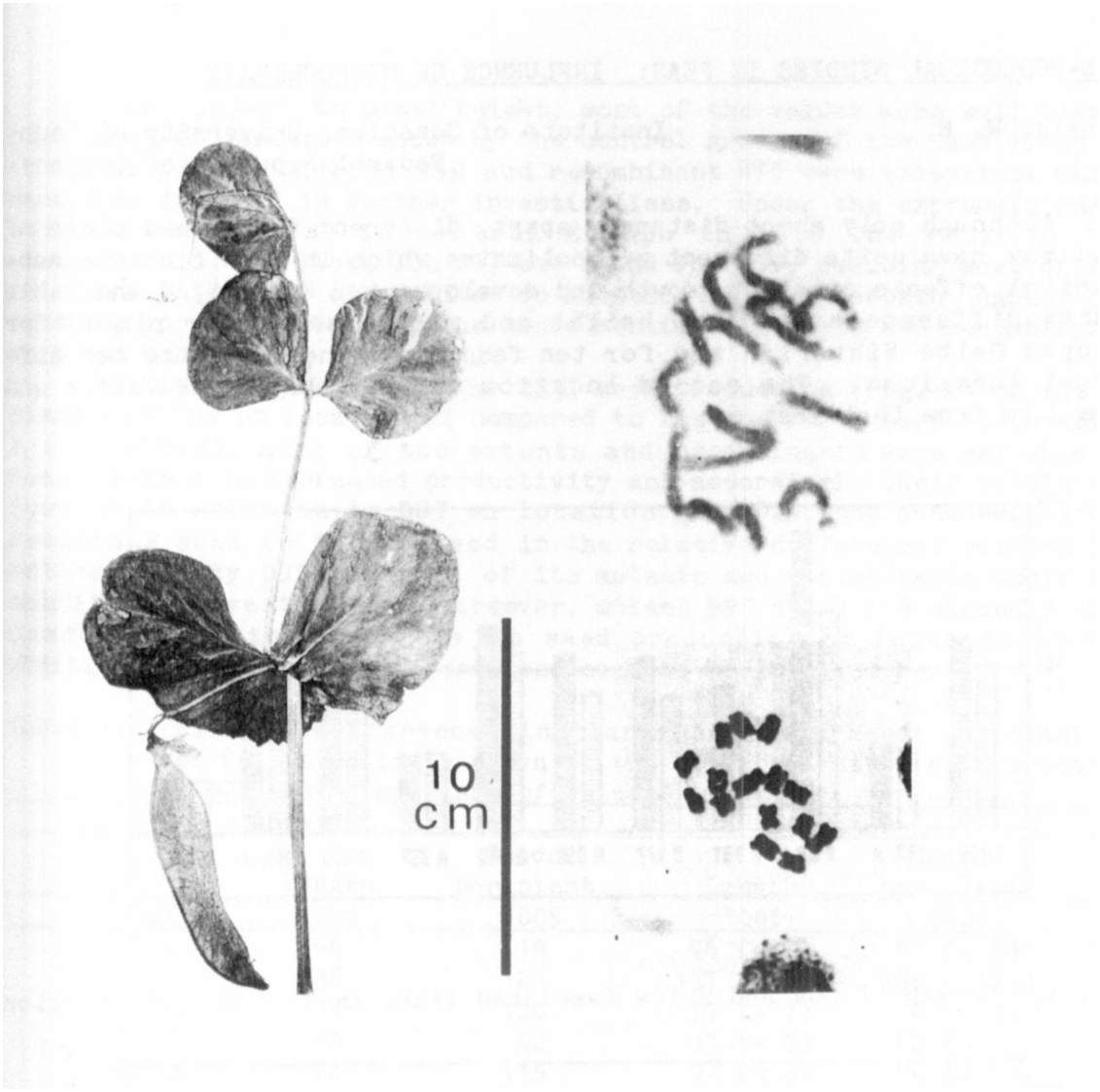

Fig. 3. Conditions in trisomic plants from F2 of L-110 x L-114. To the left the morphological response to the extra chromosome. To the right mitosis at prometaphase and metaphase.

1. Blixt, S. 1959. Agri. Hort. Genet. 17:47-75.
2. Kasha, R. J. and C. R. Burnham. 1965. Can. J. Genet. Cytol. 7:620-632.
3. Lamm, R. 1976. Hereditas 84:235-237-
4. Lamm, R. 1978. PNL 10:31-32.
5. Lamm, R. 1980. PNL 12:42-43.