Letters to the Editor

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NOTES ON POINTS IN SOME OF THIS WEEK'S LETTERS APPEAR ON P. 774.

CORRESPONDENTS ARE INVITED TO ATTACH SIMILAR SUMMARIES TO THEIR COMMUNICATIONS.

Spontaneous Chromatin Rearrangements in *Drosophila*

SPONTANEOUS chromosomal rearrangements are considered to be rare in *Drosophila*. (Pale and blond are the known cases.) During the past few years I have found two new cases of considerable interest, the detailed analysis of which was delayed by external circumstances. Both cases occurred in pedigree and closely watched cultures, the abnormal broods being among numerous identical normal ones.

The first case started with an uncontrolled change of a standard plexus culture, which began to exhibit an extreme plexus character with blisters on one wing. It was found that here a 'mutation' to an allele of blistered had been added to the plexus stock. In studying some interesting peculiarities of this line, another change occurred. After this had happened, the plexus-blistered line was examined more closely, and it was found that the change to blistered had already entailed a rearrangement involving at least the additional loci white, echinus, rudimentary and extreme left end of the first chromosome. The new rearrangement resulted in the simultaneous appearance of the original plexus, of wild type, of rudimentary, identical with the classic one and of a recessive type 'mutant' with pointed wings, at the left end of the first chromosome. Also what seems to be an ebony allele appeared and a few less viable forms with spread plexus-blistered wings, or with only blisters. The analysis of the rather complex details is nearing completion.

The second case is still more remarkable. In one of numerous crosses of wild type and blistered a rearrangement occurred which involved, as it seems, only a second chromosome. This rearrangement produced simultaneously with the disappearing of blistered, the appearance of (1) dumpy, identical with the classic one; (2) vortex-thoraxate, the same; (3) purple, the same; (4) a plexus-like form still to be localized; and (5) a recessive 'mutant' with folded soft wings. Thus three well-known 'mutants', and possibly five, were produced as the result of an intra-chromosomal rearrangement.

It is remarkable that in both these cases the rearrangement hit a whole brood, thus indicating its occurrence in primordial germ cells.

These facts and others not yet ready for presentation, as well as the results of other workers, have convinced me—as repeatedly expressed in lectures within the past three years—that the time has come to acknowledge that gene mutations have as little existence as genes themselves. (A number of geneticists have already played with this idea, but hesitated to drop the old conception of the gene. They took refuge in position effects and mutations near the locus of a break.) The idea of a position effect, made to save the gene concept, will also have to disappear when it is recognized that the position effect is actually identical with what was called a gene. The chromosome as a unit will be found to control normal development or wild type. The changes of the correct order within its chain produce deviations from normal development, called mutants. Though they are localized, there is no such a thing as a gene and certainly no wild type allelomorph. Details will be published later.

RICHARD GOLDSCHMIDT.

Department of Zoology,
University of California.
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Ionization by Radioactive Gamma and Cosmic Rays in Different Gases

THE ionization by radioactive gamma and cosmic rays in different gases has been investigated by V. Masuch[1] since 1932 and by me since 1936[2]. For all measurements we used the same Kolhörster apparatus, the zero of which was separately determined at a depth of 406 m. in the Berlepsch salt mine of Stassfurt.

The effects of a radium C gamma ray source, filtered by 6 mm. of lead, of cosmic rays filtered by 5 cm. and 10 cm. of lead and of the penetrating radiation (unfiltered cosmic rays plus radium C gamma rays from soil and free air) gave the results shown in the accompanying table.

	Density	Penetrating radiation	Cosmic rays		Ra C γ-rays*	
			5 cm. lead filter	10 cm. lead filter	Our measurements	Ziemecki
He	0·0001787	0·50 *I*	0·30 *I*	0·26 *I*	1·00 *I*	
Ne	0890	2·40	1·29	1·27	4·25	
Ar	17629	4·89		2·45	8·51	7·55 *I*
Kr	3645	10·52	5·46	5·13	19·4	20·1
X	572	21·25	8·77	7·83	31·9	
H_2	008985	0·31		0·14	0·89	
N_2	12508					3·70
Air	12928	2·91		1·60	5·08	
O_2	14292	3·23	1·88	1·78	5·82	
CO_2	19768				8·70	

* On an arbitrary scale.

In Fig. 1 the ratio ionization/density is plotted as a function of the density of the gases concerned.

The ionization is directly proportional to the density of the gases only in the case of the hard components of the cosmic rays at sea-level. With softer components the curves bend more and more. The effect