frequency of any one lethal need not necessarily reflect either present or past environments. Indeed, if many such lethals can participate in the genotype-environmental interaction, the genetic load is minimized. In fact, one possible way to distinguish between lethals perhaps deleterious in all environments (the classical genetical load) and those conditionally heterotic (heterotic in narrow range environments) would be to compare viabilities for heterozygotes carrying different lethals in the narrow fluctuating temperature range conditions.

A further point to emerge from the data is that temperature ranges appear not to be the exclusive environmental variable influencing the frequency of lethals and semilethals in the population; the average frequency of these genetic variants in samples collected during the 1938-1946 period is 48.8% while the average in summer 1967 samples is 24.2%. But this is not unexpected from the significantly positive relationship also between le + sle frequency and summer rainfall (Band and Ives, 1968) and the finding of parallel environmental changes in rainfall and temperature range in the area from 1930 through 1969.

References: Band, H.T., 1963 Evolution 17: 307-319; ____, 1969a Japan. J. Genet. 44, Suppl. 1: 200-208; ____, 1969b, unpublished manuscript; ____ and P.T. Ives, 1961 P.N.A.S. 47: 180-185; ____ and ____, 1968 Evolution 22: 633-641; Ives, P.T., 1954 P.N.A.S. 40: 87-92; Oshima, C., 1968 Proc. XIIth Intern. Cong. Genetics 2: 170-171; ____, 1969 Japan. J. Genetics 44, Suppl. 1: 209-216.

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Lack of effect of DMSO on the fertility of irradiated males exposed to low temperature.

We have previously reported (1970) some data on the viability of sperm in inseminated females exposed to 0°C during different periods of time.

While working on the action of radioprotectors at the genetic level, some experiments were done to study the combined effect of X-radiation and dimethyl sulfoxide at a low temperature, on sperm treated in adult males. Six day old Canton S males, pre-treated with a 10% solution of DMSO, were irradiated with 1000 R and submitted to 0°C during the irradiation and before and/or after the irradiation in three different treatments. Immediately after treatment the males were allowed to mate for 3.30 hours and then provided with new virgins until completion of 24 hours (a procedure followed to study the effect on immotile and on fully mature sperm). The Basc females were transferred twice, every 4 days, so the broods covered a period of 12 days. Although the proportion of F_1 males and females seemed to be normal, there was a sharp decrease in the number of offspring. It was hoped that the problem of diminished progeny, which is known to be the joint effect of radiation and low temperature, would be overcome by the presence of DMSO, a cryoprotective agent, Ashwood-Smith (1967). However, this was not the case, the number of offspring of the so-treated males did not differ from the ones submitted to irradiation and low temperature only. Males exposed to 0°C for 10 to 20 minutes produced a normal number of offspring. Only the F_1 females, which were collected for standard sex-linked recessive lethal tests are shown in the tables.

From the results shown in Table I, it is interesting to note that the males submitted to 0°C for a total period of 20 minutes, of which 10 minutes were previous to the irradiation, produced more offspring than those submitted to 0°C for a total period of 10 minutes during and after irradiation only.

In another experiment the mating procedure was changed. Of 270 males, irradiated and kept for a total period of 10 minutes at 0°C, half were mated immediately and for 24 hours, then provided with new virgins for another day. The other half were witheld from mating for one day, after which the same procedure was repeated. The two groups yielded a similar number of F_1 females, all from the first mating period (See Table II). No progeny was obtained from the second mating period. The amount of F_1 females per treated male was higher than in the previous series of experiments.

The results obtained with the second group of treated males could perhaps be explained by a process of recovery of the damaged sperm or a higher resistance of spermatids, plus a higher sensitivity of less mature germinal cells. To account for the similar results obtained with the first group of males is rather difficult; a test in dominant lethality is in progress.

References: Ashwood-Smith, M.J., 1967 Radioprotective and cryoprotective properties of DMSO in cellular systems. Ann. N.Y. Acad. Sci. 141: 45 Mazar Barnett, B. and E.R. Muñoz, 1970 Effect of low temperature on inseminated females. DIS 45: 123.

TABLE I

Treatment	No. treated males	1st mating period: 3.30 hrs. No. F_1 females 1st brood	2nd brood	3rd brood	No F_1 ♀♀/treat ♂♂	2nd mating period: up to 24 hrs. No. F_1 females 1st brood	2nd brood	3rd brood	No F_1 ♀♀/treat ♂♂
1) Irradiation	250	434	673	483	6.36	805	752	686	8.97
2) DMSO $\xrightarrow[\text{min}]{30}$ Irr	150	629	397	346	9.14	577	545	444	11.10
3) Irr+0 °C: 30 min	250	---	---	---	----	---	---	---	----
4) DMSO $\xrightarrow[\text{hr}]{20}$ Irr+0 °C: 30min	250	---	---	---	----	---	---	---	----
5) DMSO $\xrightarrow[\text{min}]{30}$ Irr+0 °C: 30min	250	---	---	---	----	---	---	---	----
6) 0 °C $\xrightarrow[\text{min}]{10}$ Irr+0 °C: 20min	234	207	29	---	0.92	230	143	79	1.93
7) DMSO $\xrightarrow[\text{hr}\ 10\text{min}]{20\ \ 0\,^{\circ}\text{C}}$ Irr+0 °C: 20min	234	103	112	65	1.19	223	126	88	1.86
8) DMSO $\xrightarrow[\text{hr}]{20}$ Irr+0 °C: 10min	275	63	20	59	0.51	92	53	27	0.62

Except for experiments 1 and 2, all irradiations were done at 0 °C.
The underlined number of minutes indicates total time submitted to 0 °C.

TABLE II

Treatment: Irradiation + 0 °C = 10 minutes

135 males, mated immediately after treatment (Mating period: 24 hrs) No. F_1 females 1st brood	2nd brood	3rd brood	No. F_1 ♀♀/treat. ♂♂	135 males, witheld from mating for 24 hrs. (Mating period: 24 hrs) No. F_1 females 1st brood	2nd brood	3rd brood	No. F_1 ♀♀/treat. ♂♂
272	65	23	2.66	174	138	19	2.45