matin rearrangements, and possibly also (as in Drosophila) the order of their occurrence, as an aid in the study of racial relationships.

If mammals, like plants, retain for long periods their extra nucleoli arising through polyploidy or any other form of duplication of the nucleolus-producing chromosomes, then the nucleoli should prove a valuable aid in tracing phylogenies in this group of animals. It is now well known that in insects polyploidy in the fat bodies and other organs is a general feature of the ontogeny. From the work of Jacobi, Wermel and others, in which the nuclei of the liver and other organs fall into a geometric series of volumes, it is evident that something of a similar kind, perhaps polyteny, may take place in human ontogeny. Polyploidy in animals may thus prove to be much more wide-spread than we have been accustomed to suppose.

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LONGEVITY OF FOWL SPERMATOZOA IN FROZEN CONDITION[1]

PRESERVATION of life in monocellular organisms by storage at low temperatures offers many possibilities in biological studies requiring long-time storage. As cited by Luyet,[2] Brehme reported that cholera vibriones survived continuous freezing for 57 days at $-1°$ C to $-16°$ C and Prucha and Brannan, also cited by Luyet, isolated *Bacillus typhorus* from ice cream kept for 20 months at $-20°$ C. Jahnel[3] reports that some human spermatozoa resumed motility after having been held at $-79°$ C for 40 days and Shettles[4] reports the resumption of motility of human sperm after 70 days' storage at $-79°$ C.

A technique for preserving chicken spermatozoa by storage at low temperatures has been described by Shaffner, Henderson and Card.[5] Results from experiments using slight modifications of the original technique indicate that time is not an important factor in the retention of motility within the first year, when fowl semen is held constantly at the temperature of solid CO_2. Spermatozoa have been maintained at a temperature of dry ice ($-79°$ C) for 14 months. Little if any difference could be noted in the percentage of cells that regained motility between samples thawed immediately after freezing or those thawed after 14 months storage.

Unmated hens producing infertile eggs were inseminated with semen that had been frozen at $-79°$ C and thawed an hour later. Of 48 eggs produced by these hens after insemination 12 were fertile. However, in no case did the resulting embryonic development proceed for more than 10 to 15 hours, as determined macroscopically.

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[1] Journal paper No. 20, Purdue University Agricultural Experiment Station.

[2] B. J. Luyet, Life and Death at Low Temperature, *Biodynamico*, Normandy, Missouri, 1941.

[3] F. Jahnel, *Klin. Wchnschr.*, 17: 1273, 1938.

[4] L. B. Shettles, *Am. Jour. Physiology*, 128: 408, 1940.

[5] C. S. Shaffner, E. W. Henderson and C. G. Card, *Poultry Science*, 20: 259, 1941.

THE ERADICATION OF NUT GRASS

FOUR years ago E. V. Smith and E. L. Mayton[1] reported that they were able to control nut grass by "plowing or disking at intervals of three weeks or less during two consecutive growing seasons." As the writer's[2] laboratory experiments have shown that nut grass is killed by 1 N chlorate or 2 N thiocyanate solutions, it seemed worth while to see if the chemical method would not offer a cheaper and quicker way of control of nut grass than that suggested by Smith and Mayton.

The experiments were performed during the spring and summer of 1940 on plots which contained 250–500 plants of nut grass per square meter. One liter of solution was applied per square meter. The chlorate ion was applied in the form of sodium chlorate, the thiocyanate ion in form of calcium thiocyanate. The author is very much obliged to the American Cyanamide and Chemical Corporation, New York, for the supply of the calcium salt. The results compiled in Table I show clearly that the result of the field experiments were less satisfactory than those of the laboratory experiments. One fifth to one fourth of the plants were still surviving after 20 days. Though some of them were very weak and died within 10 more days, still about one tenth of the weeds survived and were able to repopulate the field. Also a repeated application of the herbicide would not kill them.

TABLE I

Substance	Normality	No. of experiments	Percentage of plants surviving at 20th day	Percentage of plants surviving at 30th day
ClO_3^-	2	3	26	12
CNS^-	2	2	15	10
CNS^-	1.5	2	15	..
CNS^-	0.7	2	40	22

The reason for this incomplete control was the same as for the failure of simple tillage as a method of eradication of nut grass: the bulbs, which are the most resistant part of the plant, are relatively deep below the surface and can not all be reached by the weed killer if its solution is applied to the surface only. In May and July, 1940, further experiments in neighboring plots were, therefore, conducted in this

[1] *Jour. Am. Soc. Agron.*, 30: 18, 1938.

[2] *Rev. agr., ind. y com.*, Puerto Rico, 33: 180, 1941.