

matings per animal ($\chi^2 = 9.32$, $P = 0.01$ -, significant). One persistently infertile doe did not become pregnant when mated in conjunction with treatment. The next mating 10 days later without treatment resulted in a pregnancy, the first in 6 attempts, and this was followed by a second pregnancy also without treatment. In 2 instances, does which were non-pregnant after treatment, became pregnant following a subsequent administration of the drug plus service.

Five of the 6 deaths took place from 2-18 hours after the administration of Antuitrin "S" and were definitely associated with the treatment. The sixth death occurred 7 days after the injection and may or may not be related to the drug. All of these animals showed evidence of an acute physiological upset. Congestion and hemorrhage of the subcutaneous vessels particularly in the region of the mammary glands, and congestion and hemorrhage of the thymus, vagina and uterus were frequent findings. The exact cause of these deaths is not known at present, but the common feature of their occurrence in abnormally obese animals suggests a violent endocrine and vasomotor crisis precipitated by the drug.

The results suggest that one factor involved in the sterility of certain does is their failure to ovulate after coitus, and that this failure may be remedied by the administration of pregnancy urine principle. It is possible that repeated injections and doses larger than 40 Rat Units per kilo might cause ovulation in those does which were refractory to the treatment described herein. There is some evidence to support the view that the stimulating effect of Antuitrin "S" may lower the ovulation threshold, so that a subsequent mating after the lapse of many days and even weeks, might have a fertile result without its adjunct at the time of the succeeding matings.

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Observations on Vitamin Treatment of Reproductive Abnormalities in the Rabbit.

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The reproductive activities of certain rabbits in our breeding colony have been observed on repeated occasions to be abnormal. These abnormalities may be classified, for present consideration, in 3

phases, namely, infertility, desertion or neglect of the young, and cannibalism. Observations indicated that some of these conditions were associated with nutritional disorders and it had been found that some improvement could be obtained by a general increase in vitamin intake. Accordingly, an attempt was made to correct the abnormalities of a selected series of animals by the administration of vitamin concentrates singly or in various combinations. The results thus far obtained have been highly encouraging and these form the basis of the present communication.

A group of 42 rabbits was selected for this study. These included 38 females and 4 males of pure bred and hybrid stocks, chiefly Rex, Belgian hare, English, Havana, Dutch, Polish, Himalayan and a highly inbred Albino family. In each case previous observations had indicated that the reproductive behavior was abnormal. Following vitaminization for various periods of time, the treated animals were mated with known fertile animals and the results were measured by subsequent observations made with regard to the particular abnormality presented. In all cases except one, dried brewer's yeast, representing the B complex was used either alone or in combination with halibut liver oil or viosterol or with both. Halibut liver oil alone was employed in one case. All vitamin concentrates were administered by hand. A few preliminary tests were made during the Winter of 1932-33 and the Spring of 1933, but most of the experiments were carried out between December, 1933, and February, 1934, inclusive. The test animals have lived indoors from birth and were distributed among normals in several rooms, and all the rabbits of the colony were fed a standard diet.

Nineteen does and 4 bucks were infertile, as indicated by failure to reproduce upon repeated matings. Thirteen does either frankly deserted or made no attempt to nest or to raise the young. Six does destroyed their young at birth or within a few days after birth and deliberately ate them.

As a result of vitaminization, the abnormalities were corrected in a significant number of instances. The period of vitaminization varied from a minimum of 4 days to a maximum of $2\frac{1}{2}$ months; most of the animals were treated a little over a month. Of the 19 persistently infertile does, 9 became pregnant after vitaminization. Of these 9, 5 were pregnant upon the first mating and 4 required repeated matings—2 mated twice, 1 mated three times and 1 mated 4 times—before a fertile mating was obtained. These results as compared with those from matings made during the 3 months prior

to the treatment were highly significant as shown by the χ^2 test. Before vitaminization there were 4 pregnancies out of 83 matings and after vitaminization there were 9 pregnancies out of 26 matings ($\chi^2 = 16.75$ and $P = 0.01$ -, significant). Of the 4 infertile bucks, 3 became fertile after vitamin treatment whereas before the treatment only one of the 14 matings with known fertile does resulted in pregnancy ($\chi^2 = 8.14$ and $P = 0.01$ -, significant). Here it should be pointed out also that 2 does and 1 buck became fertile in matings made as early as 4 days after vitamin treatment began. While such a finding may be incidental, it can not be entirely neglected. There was some degree of improvement, following vitaminization in practically all of the 13 animals grouped under desertion or neglect of the young. Three out of the 6 treated animals grouped under cannibalism raised their young without any attempt to destroy them, while 3 others showed no effect with the first litter following treatment.

Furthermore, prolonged observations on some of the animals reported here indicated that once a correction has been made normal functional behavior may last for some time, even after vitaminization has been discontinued. Infertile animals were found to be fertile on subsequent matings, and animals with tendencies to desert or destroy their young proved to be excellent mothers and raised their own or foster litters without difficulty. On the other hand, some animals returned to their original abnormal state when vitamin treatment was discontinued after a temporary success had been achieved.

Those that failed to respond to vitaminization may have been cases that required much longer treatment than was given, or the abnormality may have been due to factors not correctable by vitaminization. But it is clear that certain cases of abnormal reproductive behavior are associated with a nutritional disorder and that the use of a measure such as vitaminization will correct reproductive abnormalities of this class, although the effect may be general rather than specific. The relative efficacy of the 3 vitamins employed in the experiments was not determined. However, in 16 successfully treated cases yeast alone was used.