

GENETICS

Sex Control Succeeds With Warm-Blooded Animals

Injection of Female Sex Hormone into Chick Embryos Increases the Ratio of Females to Males

ONE of the first apparently successful attempts at experimental sex control of warm-blooded animals has just been reported from the Indiana University zoological laboratories.

Through injection and absorption of female sex hormones into more than 900 chick embryos, experimenters have been able to change the normal sex ratio of about 50 per cent. females to 64.78 per cent. females. With more complete control of experimental conditions, it seems possible theoretically to control almost without exception the sex of the embryos.

This means sex reversal from male to female through artificial control. The next step in the experiment will be to attempt the more difficult change from female to male.

The possibility of experimental sex control has long been a subject of scientific investigation. Sex reversal has been accomplished experimentally in amphibians and other cold-blooded animals but has baffled science in its efforts on warm-blooded species, although Prof. F. A. E. Crew of the University of Edinburgh has reported a female fowl which laid eggs and later produced sperm.

Working for the past two years on the general problem of the effect of endocrine gland preparations on the development of the chick embryo, Indiana University investigators developed a theory of sex control through injection of sex hormones.

They took advantage of the known fact that the gonads or sex glands of the chick embryo are practically identical so far as structure is concerned until about the sixth day of development. At that time sex differentiation occurs.

Injection of hormones was started on the third or fourth day, when theoretically the gonad could be changed. The extract was inserted into the air chamber of the large end of the egg. Absorption was accomplished through the allantois of the embryo, a vascular membrane which takes up the extract.

The heavy percentage of females developing from the artificially treated embryos, as compared with the normal 50-50 ratio, seems indicative if not a proof of sex reversal. In answering the question of why the 900 embryos of the experiment showed any males at all, it is explained that the allantois or absorbing tissue of many males develops so late that the extract of female hormones is not absorbed under the present experimental methods.

Another reason for failure to bring about complete sex reversal is that the shell membranes in many cases are so dry as to absorb all of the extract before it reaches the allantois of the embryo. With complete control of experimental conditions, it should be theoretically possible to effect a complete sex reversal.

In normal development, sex is thought to be determined by the presence of certain definite bodies called

chromosomes, within the cells of the individual. A definite chromosome difference exists between the male and female sexes, but just how the chromosomes produce their effects is unknown. Granted that the chromosomes do play a part in sex differentiation, such effects are not wholly independent of environmental conditions.

Continuing the injections after sex differentiation has taken place in the chick embryo, experimenters have found that the extract of female hormones produces an abnormality in the male glands, but that the change is not sufficient to produce reversal, once sex differentiation has definitely developed.

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PHYSICS

Find Second Way of Making Radioactive Nitrogen

A NEW way of producing radioactive nitrogen by bombarding boron with the cores of helium atoms has just been reported to the British science journal *Nature* by the Russian scientists A. J. Alichanow, A. J. Alichanian and B. S. Dzelepov, of the Physical Technical Institute, Leningrad.

The supposed atomic reaction which brings about the creation of the radioactive nitrogen by artificial means is: five atoms of boron of mass 10 plus



SPIDER OF STEEL

This contorted mass of steel, resembling an octopus or huge tarantula is all that is left of a factory after it was devastated by an oil explosion and a subsequent fire. The joints, welded by the electric-arc process in 1932, remained unbroken.