

## 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.

*Science News Letter, July 7, 1934*

## 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.*

two atoms of helium of mass 4 produces seven atoms of nitrogen of mass 13 plus one positron.

The work is another step in making the disintegrating, special kind of nitrogen already produced in America in a different way. Drs. R. Crane and C. C. Lauritsen of California Institute of Technology created artificial radioactive nitrogen by shooting deuterons at carbon. The probable reaction for the California work is thought to be: six atoms of carbon 12 plus one deuteron 2 produce seven atoms of nitrogen 13 plus a positron.

Ordinary nitrogen as found in the air has atomic number 14; the radioactive kind has number 13.

The rate at which the special nitrogen is disintegrating, with an emission of a positron, was measured by the Russian scientists. Its "decay" curve, they say, is substantially the same as that measured in America for the nitrogen created by the deuteron-impact method.

"Thus," they conclude, "starting both from boron and carbon one gets the same kind of radioactive nitrogen N 13 with the same characteristic constants."

*Science News Letter, July 7, 1934*

#### OCEANOGRAPHY

## New World Record Found For Height of Daily Tide

**S**CIENTIFIC explorers are still discovering record-breaking features of world geography.

Russian investigators have just found that the greatest daily tide in the world rises and falls in the Okhotsk Sea, the huge crook in the northeast coast line of Asia. At least, the Okhotsk Sea will hold the record unless some unsuspected shore line elsewhere turns out to have even greater tide.

There are not many places in the world where the tide rises and falls once in 24 hours, instead of regularly following the usual two-a-day schedule. Such tides occur at certain places on the Gulf Coast, in Alaska, the Philippines, the coast of China and a few other scattered localities, says H. A. Marmar, specialist on tides of the U. S. Coast and Geodetic Survey, reporting the Russian discovery to the *Geographical Review*.

Daily tides heretofore known have not been impressive in size. The famous Bay of Fundy tides, which are the standard of greatness, rise mountain-like to forty feet or more, but these rise and fall in orthodox fashion twice each day. The known range of the tides that flow in and out only once a day has been only a few feet at most.

The newly-discovered daily tides of the Okhotsk Sea, however, form waves of notable size. In the month during which the Russian Hydrographic Department made tidal observations at Cape Astronomicheski, at the northeastern head of the Okhotsk Sea, the daily tide on one record-making occasion had

a range of 37 feet.

On only a few days during the month did the Russians find two high and low waters occurring at this part of the seashore. The more usual occurrence was a single daily tide, averaging fully 28 feet.

As scientists have ranged farther afield in their investigation of tides, they have become increasingly aware that their early ideas about tides were too simple. Those early theories were based on studies along the Atlantic coast, and the response of the water there to sun and moon forces was taken to be typical. On the contrary, as Mr. Marmar has pointed out, there are many varieties of tides found at different shores. The morning tide may rise higher or faster, or it may ebb slower than, or not so far as, the afternoon tide, thus varying the pattern. There are daily tides, semi-daily, and mixed.

The charting of the tides with an understanding of all these varieties is a matter of practical importance to navigators, harbor masters, and engineers.

*Science News Letter, July 7, 1934*

#### MEDICINE

## Infantile Paralysis Vaccine Being Tried in New York

**F**IRST TRIALS of a vaccine which it is hoped will give children protection against dreaded infantile paralysis are now being made.

It will be several weeks before the value of the vaccine for humans is

known, but it has already made monkeys immune to the virus of infantile paralysis.

A description of the vaccine and the results with monkeys were given by Dr. Maurice Brodie, of New York University and Bellevue Hospital Medical School, in a report to the journal, *Science*.

The vaccine is made from the active virus which causes infantile paralysis. This virus is inactivated or made non-infective by treating it with formalin. After this inactivated virus is injected into monkeys, the animals' blood shows substances called antibodies which indicate that they have developed resistance to infantile paralysis virus and are probably immune to the disease.

"It is too early to use the vaccine in California," Dr. Brodie said when questioned about its possible usefulness in protecting children from the epidemic now occurring in that state.

Latest reports to the U. S. Public Health Service in Washington indicate a slight further increase in the epidemic. There were 340 new cases of infantile paralysis in California for the week ending June 23. Thirty-six more cases were reported from the rest of the country for that week. New York reported 8 cases, Florida 6, and Alabama 5; the other states reported only one or two cases each.

*Science News Letter, July 7, 1934*

#### ECOLOGY

## Mild Winter and Drought Menace Park Animals' Range

**T**HE MILD winter of 1933-34 in the western National Park area may be of doubtful value from the standpoint of the wild animals. Not only was the weather much milder than usual throughout the entire northern range, but the snowfall was much less heavy than in former years. As a result, the animals wintered well and sought the higher altitudes much earlier than usual this spring.

Unfortunately, however, there is cause for concern in the drought conditions that have followed the mild winter, and fear is expressed by park officials that should a hard winter follow these drought conditions the wild animals may suffer severely. A mild winter always means less forage produced, greater utilization of the range, and a higher birth rate among the wild animals, thus complicating the situation.

*Science News Letter, July 7, 1934*