In rats killed after sublethal treatments the only evidence of tissue damage yet observed has been in the outer layers of the muscle cells of the heart immediately adjacent to the pericardial cavity and at the tips of the liver lobes. Such treatments have been shown to raise the temperature of the region exposed, in this case the lower thorax, to 115° F. in three minutes without affecting the rectal temperature. This would indicate that the site of greatest heat development is not in the blood stream nor in the more vascular tissues.

For animals destined for survival, the simplest method for raising the general body temperature rapidly by high frequency is to expose the torso alone between narrow plates, allowing the head and extremities to project outside the field on either side. When the whole body is exposed to a field of sufficient strength to raise the rectal temperature at the rate of about a degree per minute there occurs overheating, blistering and stiffening of the ears and of the leg muscles unless they are adequately shielded. Methods of shielding are being studied and will be presented in a later publication.

An animal whose extremities have been thus overheated while under an anesthetic exhibits upon return of consciousness a most remarkable absence of symptoms, aside from the loss of use of the muscles actually affected. There is no evidence of local tenderness nor of any other discomfort up to the time when breaking away of the killed skin exposes adjacent tissues to outside infection.

These preliminary experiments reveal a field of the utmost interest to the experimental physiologist. Here is a method for producing at will any degree of fever without the introduction of bacteria, toxins, foreign proteins or other adventitious material or condition into the animal body. The increase of temperature is produced directly within the animal structures as in ordinary fever. It occurs promptly while the animal is in a normal condition in other respects. Its uncomplicated effects are thus thrown open to direct study. We may hope very soon to solve the long-vexed question of whether fever is a functional response or merely a condition secondary to infection or trauma.

It may be well in this connection to offer a word of warning. It would seem advisable to use extreme care and to postpone until after thorough investigation the exposure of human beings to the more powerful types of this apparatus. We can not yet predict with certainty just where extreme local heating might occur before the general body temperature gave sufficient warning. The serous cavities would seem to offer the optimum conditions for such local heating, endangering the adjacent tissues.

These general observations are presented at this time for the assistance of any who may be initiating research with such apparatus. Work is being continued in these laboratories, bearing particularly upon the characteristic heating effects produced by high frequency fields both in animal structures and in simpler systems and their modifying reactions upon physiological function and bacteriological and pathological growth.

Grateful acknowledgment is made for the constant encouragement and assistance received from Dr. W. R. Whitney, of the Research Laboratory of the General Electric Company, at Schenectady, as well as for the loan of the necessary apparatus and for its modification from time to time to suit the needs of the work.

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SEX STERILITY AND THE DIMINUTIVE COPULATORY ORGAN IN THE DOMESTIC FOWL

STERILITY associated with the absence of the male copulatory organ in the domestic fowl has been noted according to the following observations:

While making anatomical examinations of the cloaca of White Leghorns for the presence of the diminutive copulatory organ, four yearling cockerels out of seventy-eight were found in which the organ was absent. Three have proven sterile or sexually abnormal.

One of the four had been killed. During the autopsy the testes were found to be abnormally small, as in a non-functioning state, being one fourth normal size. Records were examined for fertility tests and a second cockerel lacking the organ had been in a mating pen with twelve pullets for two weeks during January, 1928, without fertilizing a single egg.

The two remaining cockerels have now been tested. One fertilized three out of thirty-seven eggs, thirteen days after mating. The fourth fertilized twenty-three out of twenty-four eggs set, being the only one of the four to prove normal. Thirty-three of the remaining seventy-four have been tested, and all showing the organ have fertilized 65 to 98 per cent. of eggs set.

The capons examined (four in number) lack the copulatory organ. Unlike the capon, however, the cockerels lacking the gland retained the characters generally considered as secondary sexual. They appeared as vigorous as any other healthy cockerel. In view of these facts the indications are strong that at least one type of sterility may be detected in the

cockerel by cloacal examination before he is placed in the mating pen. The only sterile birds in the flock—except one that died before this examination was made—were those in which the gland could not be found. Failure to find the gland in a young chick does not always indicate its absence, but in a grown cockerel the gland usually attains a size of two to three mm in diameter. There is considerable variability in size, but no relationship between the size and fertility was noted. These birds are being retained for further study.

Masui[1] claims to be able to separate the sexes of baby chicks by a similar examination—but gives no figures on the degree of accuracy or the possibility of exceptions. From our own observations the sexes can be separated with an accuracy of 75.6 per cent. at two weeks (127), and 81.7 per cent. at four weeks (186), and 88.1 per cent. at five weeks (67). The errors are of two kinds. One is due to faulty observation and is gradually eliminated with practice and familiarity with the technique required. The other error is due to the actual presence of the gland in the female and the absence of the gland in the male. The gland is definitely present in a few female chicks now ten weeks of age, and likewise absent in a few males.

These latter exceptions in chicks may merely represent the delayed dominant action of the gonads over the primary sexual characters of the opposite sex. On the other hand, these exceptions may have a relation to later sexual development and form the interesting class of delayed sexual maturity or even sterility as shown in the adult males examined.

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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE POMONA COLLEGE MEETING OF THE PACIFIC DIVISION

THE Pacific Division of the American Association, with the Southwestern Division and a number of participating societies, held its twelfth annual meeting at Pomona College, Claremont, California, Wednesday to Saturday, June 13 to 16, 1928. About five hundred persons were present. The general sessions began on Wednesday with a luncheon at which the progress of research on the Pacific coast during the past year was traced by the speakers. Dr. R. G. Aitken, of Lick Observatory, spoke of discoveries in astronomy; Dr. I. S. Bowen, of the California Institute, in physics; Dr. W. C. Bray, of the University of California, in chemistry; Dr. P. A. Munz, of Pomona College, in botany; Dr. B. M. Allen, of the University of California at Los Angeles, in zoology; and Dr. K. F. Meyer, of the Hooper Foundation, San Francisco, summarized recent research in medical science.

On Wednesday afternoon the remarkable motion picture showing activities of living tissues *in vitro*, prepared by Dr. Ronald G. Canti, of the Cancer Institute and St. Bartholomew's Hospital, London, was shown. The periosteum of chick embryos, an amoeba and a sarcoma of the rat were seen with varying magnifications and varying rates of "speeding up." The behavior of blepharoplasts and other types of cells, the growth of tissues, cell-division and immobilization upon exposure to radium were all very clearly evident. The film was demonstrated by Dr. C. A. Kofoid, president of the Pacific division, who had seen it in Europe and obtained it for the meeting. So many wished to see the film a second time that it was repeated on Friday morning.

In the evening Dr. Frank P. Brackett extended to the visitors a welcome to Pomona College. After a brief response by Dr. E. G. Martin, chairman of the executive committee of the division, Dr. Kofoid gave the presidential address, on "The Luminescence of the Sea." The many unsolved problems involved in the astonishing increase in numbers of particular species of dinoflagellates, the resulting brown or red coloration of the sea-water and its luminous appearance at night, and the destructive effects of these epidemics upon the animals of the sea were touched upon. An outdoor reception followed the address.

The addresses of general interest presented as part of the intersectional meeting of the American Chemical Society will be mentioned in a later part of this report.

The Thursday evening address by Dr. F. H. Seares, assistant director of the Mount Wilson Observatory, was on the subject "Counting the Stars." Dr. Seares showed the manner of exploring the universe by systematic sampling of the numbers of stars of different magnitudes in unit areas of sky at varying angular distances from the Milky Way and of the statistic analysis of the data thus obtained.

On Friday evening Dr. Charles K. Edmunds, the new president of Pomona College, addressed the division on "Some Physical Features of China." His

[1] Masui, K., 1927, Report of the Proceedings of the World's Poultry Congress, Ottawa, p. 156.