corded observations of this weird phenomenon by Ranger Marguerite Arnold."

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THE NORMALITY OF THE MATURATION DIVISIONS IN THE MALE OF DROSOPHILA MELANOGASTER

IN a recent article in SCIENCE, "Recent Discussions of the Reduction Division in *Drosophila melanogaster*," Jeffrey[1] has assailed Belar's[2] conclusion that the maturation phenomena in this form are normal. For the past six months the writer has been studying maturation and allied phenomena in the male gonads of *D. melanogaster* and, since my observations seem to explain quite simply the anomalies reported by Jeffrey in his preparations, a brief description of my results is given below.

The gonads of larvae of varying ages were quickly dissected in a 2 per cent. urea solution and transferred immediately to strong Fleming's fluid containing 1 per cent. of urea by volume. After fifteen to thirty minutes the tissue was placed in Herman's fluid containing 1 per cent. urea and fixed for three hours. This is the technique used by Painter in his translocation studies.

When primary spermatocytes stained with iron hematoxylin were first studied, the number of darkly staining elements observed was larger than was expected from the diploid chromosome number in the male, but further examination revealed a great variation in the number and size of these stained bodies. On close study, these structures could be separated into two groups, the first made up of the four tetrads, identified by their shape, and the second containing the other bodies which did not stain so intensely as the tetrads and whose shape was usually spherical. Often these spherical globules appeared quite hollow, and they exhibited no definite relation to the equatorial plane. It was variation in the amount of this second type of material which gave the impression of variable chromosome number. As these observations suggested that the material included in the second group was not chromatin, differential strains were used. After being stained with Auerbach's acid fuchsin-methyl green, the tetrads were green, while the other elements were bright red. More extensive study of numerous preparations gave the following facts: (*a*) a very large acidophilic nucleolus is present in the growth period of the first spermatocyte. It is usually spherical but it may appear as a mass of globules. (*b*) There is no regularity in the time at which the nucleolus breaks up and loses its capacity to retain the stain. In some instances it ceases to stain before the first maturation spindle is formed, while in other cells it breaks up into a number of globules which take the stain well, even as late as the telophase of this division. This behavior of the plasmosome explains the variation in the amount of the apparent chromatin in the first maturation spindle. If it disintegrates before the spindle is formed, only the tetrads are present at the time of division, while if it has fragmented but has not lost its capacity for staining, the products lie in the region of the spindle and stain with iron hematoxylin, giving the appearance of true chromatin.

There are four tetrads in the first maturation spindle, conforming in size to what might be expected from the diploid chromosomes. They divide normally with the X and Y elements segregating to the opposite poles. If plasmosomes are present in the cell, they tend to be roughly distributed to the two poles, but they are never included in the new nucleus. By the second maturation division the plasmosomes have usually disappeared and the chromosomes are easily studied. Their division at this time is normal.

These facts seem to give a simple explanation of the figures published (and demonstrated) by Jeffrey. In his cells there were two types of material, chromosomes and plasmosomes; but, due perhaps to the preservative used, the true tetrads could not be identified by their shape, as in my material. The structures described by him as "chromosomes . . . far removed from the equatorial line" are obviously the same as the deep-staining bodies which I have found in similar cells and which give an acidophilic reaction with differential stains. The irregular distribution of the plasmosome material to the cytoplasm of the two daughter spermatocytes, in my opinion, has been misinterpreted by Jeffrey as the elimination of true chromatin.

From my observations I am forced to conclude that the maturation process in *Drosophila melanogaster* is normal as far as chromosomes are concerned. Why the plasmosomic material should show such variation in the time it loses its staining capacity is not clear, unless it be due to the great rapidity with which maturation is carried on in this form.

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SAND-STORM ELECTRICITY

I HAVE read with much interest the discussions on atmospheric electricity in SCIENCE for March 30, 1928; May 3, 1929, and October 18, 1929. On June 23, 1927, I read a paper on "Some Remarkable Elec-

[1] SCIENCE, 70: 579–580, December 13, 1929.
[2] "Die cytologischen Grundlagen der Vererbung," Berlin, Gebrüder Borntraeger, 1928.

trical Conditions Accompanying West Texas Sand-storms" before the American Physical Society at Reno, Nevada, which paper was abstracted in the *Physical Review*, 30: 362, September, 1927.

Of the four papers mentioned above, it seems to me that only two refer to anything like similar conditions. The experiments of Brasch, Lange and Urban, in Switzerland, were made during thunder-storms. The air was probably quite free from dust. Nothing is said on that particular point, but one would expect the air to be quite pure in the mountains of Switzerland. The observations of Benade, in India, seem to have been made when a variety of atmospheric conditions were present such as sand, dust, rain and lightning. I take it for granted that the climate in that part of India is quite moist, although the author says nothing on that subject. The observations of Canfield in New Mexico and of George, Young and Hill at this school were made under cloudless skies when rain, thunder and lightning were conspicuous by their absence. As a matter of fact, west Texas sand-storms are generally accompanied by a humidity so low as to be almost unmeasurable. I believe it is generally understood that whatever the cause of sand-storm electricity may be, it is altogether different from that which is responsible for the electrical display during thunder-storms.

By reference to the above-mentioned abstract it will be observed that we obtained voltages about twice as high and currents about six times as great as those observed by Benade. As to the magnitude of the current, however, I think it probable that, under given conditions, it varies directly with the total area of the collector. That, however, remains to be verified. Our collector was a radio aerial consisting of a single stranded wire 33.75 meters long arranged east and west in a nearly horizontal position, with a lead-in wire about one third as long.

I think Benade is quite right in intimating that the effect is not due entirely to friction. Recently Dr. W. H. Abbitt, of this laboratory, has made observations which seem to indicate that an effect may be obtained during a sand-storm from a loop aerial located in a practically dust-proof laboratory. These observations, however, need confirmation.

The climatic conditions at Jornado Range are probably quite similar to those in west Texas, and Canfield's observations are very interesting to us here. I am inclined to think, however, that he is mistaken on one point, and that is with respect to the arc which he says he obtained. To maintain an arc three and one half centimeters long in the open air would require a current of quite a different order of magnitude from what I believe to be possible under the conditions of his experiment. Besides, the ends of the wire, under the intense heat of the arc, would have rapidly melted away. The melting-point of copper is not over 1080° Centigrade, while the temperature of the arc may run up to about 4000° Centigrade. I am of the opinion that what he observed was a succession of spark discharges which followed each other so rapidly that, due to persistence of vision, it seemed to be continuous. The noise, however, would probably be quite different from that of the arc. The glow which he obtained at night seems to have been a corona discharge.

There is a world of literature on the subject of atmospheric electricity dating back to and beyond the experiments of Lord Kelvin. An excellent résumé of the literature on the electrification of various kinds of dust and smoke is given in "Clouds and Smokes" by W. E. Gibbs published by J. and A. Churchill, London. But in spite of all that has been done in this field, a field pregnant with great potentialities, we have scarcely made a beginning. Dr. Abbitt has taken over the work on stand-storm electricity at this school. He is now working on a new type of apparatus for measuring the electrical potential of the atmosphere.

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ABSENT-MINDEDNESS AS A FACTOR IN PROFESSIONAL ETHICS

Several exceedingly interesting instances of professional ethics which have more or less recently come to my attention furnish food for thought. They are related here with essentially correct details but purposely disguised so that the authors, specialities and countries can not be identified; the purpose of this disguise (involving "not less than" in connection with the number of pages and number of illustrations) is to bring out underlying principles without embarrassing the authors. Upon relating these cases to some colleagues "in the club," a responsive chord was struck and I was urged to publish the instances.

The citations themselves can well be prefaced by the premise that practically all authors occasionally, however absent-mindedly and inadvertently, commit sins of omission or of commission. The instances here related represent somewhat extreme examples of absent-mindedness (if that be the correct technical term).

Case 1. An article of not less than forty pages, with not less than fifteen illustrations; ten of these are immediately recognizable to the initiated as copied from other authors, but no acknowledgment is given.

Case 2. An article of not less than six pages, with not less than eight illustrations; four of these are