may serve to illustrate what seems to the reviewer a serious fault in the treatment of theory, making it frequently incomplete, scattered and difficult to find.

The statistical information is much more satisfactory. An enormous amount of information is given, much of which is not available in any other reference book with which the reviewer is familiar. The historical method of treatment is employed, and an unusual amount of the older data is introduced. This may sometimes lead to a little confusion, as it is frequently followed by conflicting subsequent data, without comment by the author.

The references seem extremely full. They are given at the end of each minor subdivision, and may prove difficult to use unless a complete author index is to be included eventually. Many subjects are brought quite up to date; in others ten or twenty years may have elapsed since the latest reference quoted.

The style is that associated with the author's previous works—vigorous, entertaining, and interwoven with philosophy and humor, making the treatise unusually "readable" for a work of its type. In fact, it may be that it fulfills the purpose of providing outside reading for the advanced student better than most other purposes for which such a work may be used. Errors and misprints seem rare; rather curiously most of the errors which the reviewer has detected occur in the form of statements which say exactly the opposite of the author's intention. The book is very well printed and attractively designed. In the text words of particular importance are printed in heavy type, which aids the eye in locating particular subjects on the page.

The three separate volumes may be discussed briefly.

Volume I is somewhat introductory in nature, containing several historical chapters, together with such subjects as "The Physical Properties of Gases," "Solutions," "Crystals," "Thermodynamics and Thermochemistry," as well as the chapters devoted to "Hydrogen," "Oxygen" and their compounds. The volume is most satisfactory, in the opinion of the reviewer, in the purely historical chapters, and in the excellent chapters on "Ozone" and "Hydrogen Peroxide."

Volume II treats the halogens as a group, with comparison and contrast of their properties and those of their compounds, over four hundred pages being devoted to them. As an example of the large number of references it may be noted that seven pages of references in fine print follow forty pages of text on the subject of "Metallic Halogenates." The alkali metals (including ammonium compounds) are given treatment similar to the halogens.

Volume III treats "Copper," "Silver," and "Gold," separately and in much detail, while the alkaline earths are treated as a group.

Volumes II and III contain, naturally, a much larger proportion of statistical information than is the case with Volume I. They are therefore less subject to the criticisms indicated above, and seem to the reviewer more satisfactory for reference purposes.

On the whole the "Comprehensive Treatise" undoubtedly represents a most important contribution to chemical literature, and one that will prove invaluable to the investigator as a source of information and suggestion, and to the advanced student and teacher as a source of "outside reading" which will prove interesting and valuable.

The remaining volumes of the series will be awaited with much interest.

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## SPECIAL ARTICLES

### A NEW OCCURRENCE OF THE BLACK-EYED YELLOW MUTATION IN RATS

IN 1914 a strain of black rats was developed in the animal colony of the Wistar Institute from several black individuals obtained in the $F_2$ generation of a cross between a wild Norway male and an albino female. The strain has been maintained through some 25 generations in which many hundreds of rats have been reared that have always bred true to type.

On January 14th, 1922, a litter of eight young was cast by a young black female that had been mated to a male taken at random from the black stock; all of these young later developed into seemingly pure blacks. Three days after the birth of this litter a ninth individual, apparently less than 24 hours old, was found in the nest. This individual, a female, was about to be discarded when it was discovered that the eye were a much lighter color than those of normal black rats at birth. It was reared by an albino female, and developed into a light grayish colored rat with dark red eyes. A color variety of this kind had never been seen in the colony.

When mature, this mutant female was mated with a "dilute gray" male.[1] The offspring of this mating, three males and two females, were all of the wild gray type, indicating that the new mutation was not one of the color-albino series of allelomorphs like dilution. When these grays were inbred they produced, among other color varieties, black-eyed yellow young. Yellow varieties of rats had previously been obtained only from the stock originally imported from England by Dr. Castle in 1914. As the Wistar colony

[1] P. H. Whiting and Helen Dean King, "Ruby-eyed dilute gray, a third allelomorph in the albino series of the rat," *Jour. Exper. Zool.*, vol. 26, 1918.

contained none of these rats, Dr. Castle kindly sent several for breeding tests.

A mating of the mutant female with one of Dr. Castle's pink-eyed yellow males gave young of the wild gray type; with a black-eyed yellow male the offspring were all black-eyed yellows. The types of young produced in the $F_2$ generation of these crosses proved conclusively that the mutant female was a "cream" or non-agouti form of the black-eyed yellow rat. The formula for the mutant is aarr, when A is the agouti and R the normal dominant color factor in black-eyed yellow.

The parents of the mutant produced a total of six litters containing 57 young, of which five individuals, two males and three females, were creams; 14 creams was the number to be expected. The mother of the mutant when mated with another male from the black stock cast only black young.

The sire of the mutant was mated with three other females taken at random from the black stock. Two of these females produced a total of 76 young, among which there were thirteen male and six female creams; the other female cast 30 young that were all black. This male was later mated with three of his black daughters: two cast only black young; the other produced six male and seven creams in a total of 34 young. The four females that produced creams among their offspring cast a total of 167 young, among which there were only 37 creams, although one fourth of the number, or 42 creams, were to be expected.

Several matings were made between black sibs of the mutants, but only black young were obtained. No other matings in the black strain have, as yet, given any of the creams.

The black sire of these mutants was born in July, 1921. When taken for breeding he appeared to be pure black, but as he grew older marked color changes appeared in his coat. Patches of hair on the sides of the body became ticked, like the hair of wild Norways, and on the posterior part of the back the hair was dark brown; around the head the hair remained black. None of the females that cast cream young showed any pronounced changes in coat color. The male developed pneumonia early in 1923 and would no longer breed. An autopsy showed that one testis was atrophied; the other appeared normal and will be examined cytologically by Dr. Ezra Allen.

The appearance of cream young among the offspring of black parents indicates that both parents must have been heterozygous for the cream factor, otherwise cream, being recessive to black, would not have appeared in the offspring. When and how the mutant factor originated can only be a matter of conjecture. It may have existed in the germ cells of the wild Norway male from which the black strain was derived, and failed to affect the coat color of any of the offspring because matings were not made between individuals heterozygous for this factor. This supposition seems untenable, since the strain was closely inbred and a large number of individuals reared. It seems more probable that the cream factor appeared in the germ cells of a black rat only two or three generations back, and that the chance mating of heterozygous individuals brought out the mutant form.

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## THE OHIO ACADEMY OF SCIENCE

THE thirty-third annual meeting of the Ohio Academy of Science was held at Oberlin College, Oberlin, March 30 and 31, 1923, under the presidency of Professor Albert P. Weiss, of Ohio State University. Fifty-five members were registered as in attendance.

Dr. T. C. Mendenhall presented an appreciative memoir of Emerson McMillin, of New York City, whose death at the age of seventy-eight occurred on May 31, 1922. A member since 1892, and elected to fellowship in 1920, Mr. McMillin was always intensely interested in the work of the academy, although, so far as is known, he was never able to attend a meeting. Although he was personally unknown to the great majority of the present members, his generous contributions to the research fund, continued through a quarter of a century, have been a constant stimulus to the research spirit of the academy and the research work of its membership. Dr. Mendenhall's memoir appears in the May–June number of the *Ohio Journal of Science*.

Twenty-five new members were elected, and the following eight members were elected to fellowship: William Letchworth Bryant, Walter C. Kraatz, Paul Marshall Rea, Septimus Sisson, Warren N. Thayer, Roy Curtis Thomas, Lewis Hanford Tiffany, Edward L. Wickliff.

Officers for 1923–24 were elected as follows: *President,* K. F. Mather, Denison University; *vice-presidents—zoology,* W. M. Barrows, Ohio State University; *botany,* H. H. M. Bowman, Toledo University; *geology,* J. E. Carman, Ohio State University; *physics,* W. C. Devereaux, U. S. Weather Bureau, Cincinnati; *medical sciences,* B. M. Patten, Western Reserve University; *psychology,* H. A. Aikins, Western Reserve University; *secretary,* W. H. Alexander, U. S. Weather Bureau, Columbus; *treasurer,* A. E. Waller, Ohio State University.

The annual geological excursion, under the direction of the incoming vice-president for geology, Professor J. Ernest Carman, has been reported somewhat