The source of light was a one and a quarter ampere mercury vapor arc lamp with a corex glass bulb containing a window less than two one-thousandths of an inch in thickness. The ultra-violet obtained had a wave length of from 2,500 to 3,650 angstrom units. There was a little visible light given off but practically no heat. The *Paramaecium* were placed in a cavity slide with the water about two millimeters thick and at a distance of about two inches from the window of the tube so that they could be watched through the microscope during the exposures. The following results were noted:

(1) The *Paramaecium* becomes shorter and much thicker. After about half a minute of irradiation under these conditions a limit is reached at which time the *Paramaecium* is about three quarters its original length, the diameter being larger as a result.

(2) The cell wall is shown to be composed of at least two layers which separate to form a sort of blister. This took about one and a half minutes' total exposure. That there is a distinct cell wall between the blister and the interior of the *Paramaecium* may be shown by the fact that the cytoplasm can be seen entering the blisters which before were quite clear and free of all matter.

(3) The proteins of the cytoplasm coagulate. Thus the food vacuoles and contractile vacuoles, etc., which were clear and sharp, become indistinct and undifferentiated.

(4) The outer wall finally breaks, letting the coagulated cytoplasm into the surrounding liquid where it disintegrates.

(5) Perhaps of most interest, the *Paramaecium* fluoresce a pale violet color when living but seem to lose this property when dead. This may best be seen when the field is illuminated with a yellow light at the same time that the ultra-violet is turned on the *Paramaecium*.

(6) After having been exposed for about half a minute, although the *Paramaecium* do not die immediately, they will not live more than two or three hours and will never divide or continue growth—due probably to the fact that the life processes are stopped by the coagulation. It was found that specimens which had partly divided by simple fission stopped at whatever stage they were and died several hours later having been exposed for only half a minute.

(7) Most of the specimens threw out a tremendous number of trichocysts.

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THE NORTH AMERICAN LUNG FLUKE

ALTHOUGH the lung fluke, *Paragonimus,* has been reported from cats, dogs and pigs in this country since 1894 the life history, until the present time, has been unknown. In the course of studies on the parasites of our native mink, *Lutreola vison,* it was found that this fluke is not uncommon and at the suggestion of Dr. W. A. Riley a study of the life history was begun.

A wide variety of aquatic animals serving as food for mink was taken into consideration, but since various species of fresh water crabs and crayfish act as an intermediate host of the Asiatic lung fluke, *P. westermanni,* particular attention was devoted to the native *Astacidae.* These were often found to harbor immature flukes and during the summer of 1930 a single specimen, regarded as possibly *Paragonimus,* was found in a *Cambarus* from a small creek near Minneapolis. On November 11, 1930, large numbers of distome metacercariae agreeing closely with Kobayashi's[1] description of those of the Asiatic lung fluke were found in *Cambarus immunis spinirostris*[2] from the same creek. Since then particular attention has been devoted to these larval forms.

The cysts are spherical and transparent, measuring 2.5 mm to 5 mm in diameter. The enclosed larvae are sometimes folded and sometimes straight. When excysted their length varies from 0.5 mm to 2 mm depending on the degree of contraction. They are covered with minute spines and each possesses a large boring spine on the dorsal side of the oral sucker. The intestinal rami are striking in their similarity to the large convoluted rami of the adult *Paragonimus.* The excretory bladder is a large, conspicuous, unbranched sac extending anterior to the acetabulum and filled with highly refractive globules. A short distance posterior to the acetabulum two small ducts extend laterad from the bladder, each one bifurcating into an anterior and a posterior branch. The characteristic red color noted for the metacercariae of *P. westermanni* is lacking.

Thirty-two per cent. of the crayfish examined from the creek in question were infected. The cysts varied in number from 1 to 8 and without exception were found in the pericardial cavity.

These cysts were fed to two cats, the first cat receiving 35 between November 13 and 17, and the second receiving 30 between November 25 and 27. The animals used were reared on the experimental ranch of a commercial animal food company and had no access to aquatic animals. In the laboratory they were fed a commercial preparation, milk and liver. Frequent fecal examinations over a period of six

[1] Kobayashi, Harujiro, "Studies on the Lung Fluke in Korea. I. On the Life History and Morphology of the Lung Fluke," Mitt. Med. Fachschule zu keijo, 97–115, 1918.

[2] The writer is indebted to Dr. Samuel Eddy for the identification of this crayfish.

months had shown light roundworm infections but no trematodes.

January 5, 1931, both cats were coughing badly and eggs of *Paragonimus* were found in the feces of the one first fed. The second and apparently more severely affected animal was killed. Examination revealed 24 young flukes, measuring from 4 to 6 mm in length, encysted in pairs in the lungs. Although no eggs were yet being produced, stained and cleared specimens left no doubt as to their being *Paragonimus kellicotti.*

It is thus evident that at least one species of our native crayfish serves as second intermediate host of the lung fluke. Further studies on the life history and significance of the parasite in North America are being undertaken as a cooperative project of the departments of zoology and of entomology and economic zoology at the University of Minnesota.

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A PRELIMINARY NOTE ON THE OCCURRENCE OF A COLOR MUTATION IN THE HOUSE MOUSE (MUS MUSCULUS)

THE known genes of the mouse, *Mus musculus,* are more numerous than those of any other member of the rodent order, although there are still several known genes in other species of rodents which have not as yet been observed to mutate in mice. Animal experimenters are continuously on the watch for inherited variations in any of the visible characters of their stocks, and, since the occurrence of detectable mutations is rare in mammals, it is of interest to find a color character in a highly inbred strain of mice which has not, to our knowledge, occurred before.

This inbred strain of control animals has been produced in these laboratories by progressive matings from one pair of animals. The present stock is made up of animals which have been bred by brother-sister, or back-cross to father, matings and are now 20 or more generations removed from the original parent animals. The genetic constitution of this strain is given as aabbCCDDPP, etc., by the symbols of the American Mouse Club. Phenotypically these animals have a chocolate brown coat which is solid except for an irregularly occurring white patch on the ventral surface of the trunk or on the tail.

In the later part of August, 1930, two color mutants were observed among the progeny of these chocolate brown mice. The mother of these animals, ♀10367, had been mated to her brother, ♂10368. A sister, ♀10366, produced a litter by the same male in which there were four phenotypically normal animals. Three of these young (♀11045, ♀11044 and ♂11042) were mated brother to sister.

In October female 11045 gave birth to a litter of four young, two of which were apparently identical in color with the previously observed mutants.

The chocolate brown strain of mice from which these animals have appeared has bred true to color since its origin from heterozygous black (Bb x Bb) parentage 20 generations previous to the present occurrence. The new mutant animals resemble somewhat the dilute brown mice (ddbbaa) which are a familiar laboratory strain. They are of a lighter shade than these animals, the lightness being pronounced on the ventral surface of the body and around the head. No difficulty is encountered in distinguishing the mutants from the ddbbaa animals.

The mutant animals are fertile and breed true. The new color character has been tested and found not to be in the Dd (intense, dilution) or the C c^{ch} c^{d} c (color, chincilla, extreme dilution, albino) allelomorphic groups, and is recessive to the presence of chocolate brown.

The character is being tested and will be reported more fully.

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BOOKS RECEIVED

BRADLEY, J. CHESTER. *A Manual of the Genera of Beetles of America North of Mexico.* Pp. x + 360. Plates. Daw, Ilston.

CLARK, AUSTIN HOBART. *A Monograph of the Existing Crinoids. The Comatulids. Volume I, Part 3.* Bulletin of the U. S. National Museum, Smithsonian Institution, No. 82. Pp. vii + 816. Plates. Government Printing Office. $2.00.

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SHERMAN, H. C., and S. L. SMITH. *The Vitamins.* Pp. 575. American Chemical Society Monograph Series. Chemical Catalog Company. $6.00.

WOODWORTH, ROBERT S. *Contemporary Schools of Psychology.* Pp. vi. + 232. Ronald Press. $2.50.

Errata: Dr. Karl Landsteiner requests that the following corrections be made to his article appearing in the issue of SCIENCE for April 17:

Page 406, first column, line 7: In place of "isoantibodies," read "immune isoantibodies."

Page 408, second column, line 4: In place of "tumors," read "ulcers."

Page 409, first column, line 7: In place of "which," read "who."

Page 409, second column, line 7: In place of "protein," read "proteins."