

was filtered either through a small improved Seitz filter (Uhlenhuth model) or through a Berkefeld W. candle, and all attempts to demonstrate aerobic or anaerobic microorganisms in these filtrates by means of improved culture methods have been without success.

After a preliminary period of isolation (to preclude the chance of a natural infection arising), the subjects were inoculated intranasally and the pharynx was swabbed with small amounts of the same filtrate. In the first group of experiments, 10 volunteers were inoculated, half of them receiving Berkefeld V. filtrates and the other half Seitz filtrates. Two subjects from each group developed colds. From one of those developing a cold subsequent to the inoculation of Berkefeld V. filtrates, serial passages were made through 2 subjects by means of Seitz filtrates. In a second experiment successful serial transmissions were accomplished through 3 individuals by means of Seitz filtrates and the infection was carried through a fourth passage by means of Berkefeld W. filtrates. All volunteers were examined, both before and after inoculation, by independent observers.

To recapitulate: Of 5 individuals inoculated with Berkefeld V. filtrates of the nasopharyngeal washings from natural colds, 2 developed colds. Nine of 15 individuals inoculated with Seitz or Berkefeld W. filtrates of nasopharyngeal washings from acute colds, developed colds. Serial transfers through 2 and 4 individuals respectively, have been accomplished by means of Seitz or Berkefeld W. filtrates. All of the Berkefeld V. filtrates contained filter-passing anaerobes, while in all instances both aerobic and anaerobic cultures from the Seitz and Berkefeld W. filtrates remained sterile. These findings confirm and extend the observations of Kruse, Foster and of Dochez and his associates, that the infectious agent of acute upper respiratory infection (the common cold) is a filterable virus.

5153

**Stillbirths in a Mouse Interspecific Cross**  
(*Mus musculus* x *Mus bactrianus*)

C. V. GREEN. (Introduced by C. C. Little.)

*From the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine.*

Reports of species crosses among rodents have been infrequent in the literature and in most of these only small numbers were involved.

A general phenomenon of such crosses has been the presence of heterosis. This has been manifested under several forms such as large size of the hybrids, longevity and increased fecundity. Another criterion might be the frequency of stillborn young since, as Feldman<sup>1</sup> concluded in the case of rats, stillbirths are due at least partly to impaired vigor of the female. Thus the paucity of stillbirths among the offspring of hybrid females would be a relative measure of augmented vigor. The present note presents some data on this point.

The forms used in this cross were the Little inbred strain of dilute brown non-agouti *Mus musculus* and a stock of *Mus bactrianus*, the original animals of which were captured near Peiping, China, in 1926. They are small, light-colored, white-bellied murids (genetically, intense black agoutis) intermediate between the subspecies *gansuensis* Satunin and *tantillus* Allen,<sup>2</sup> on the whole nearer the former. They mate readily with *musculus* and the offspring of both sexes are fertile. The first generation hybrids are intermediate in body weight although in such skeletal measurements as skull length, femur length and tibia length they usually equal or exceed the larger parent. Heterosis is markedly manifested in the increased litter size of the females, their litters averaging  $6.4 \pm 0.12$  as opposed to  $5.4 \pm 0.04$  for the straight dilute brown non-agouti *musculus* and  $4.6 \pm 0.11$  for *bactrianus*.

Perhaps the most striking characteristic of increased vigor of the hybrid females, however, is the extremely rare occurrence of stillbirths among their offspring. The following table summarizes the data for the several types of matings.

TABLE I.

| Mating                                                        | Living Young |     | Stillborn Young |    |   | Total Born | Total Still-born | % Stillborn      |
|---------------------------------------------------------------|--------------|-----|-----------------|----|---|------------|------------------|------------------|
|                                                               | ♂            | ♀   | ♂               | ♀  | ? |            |                  |                  |
| 1. <i>bactrianus</i> ♀ x <i>bactrianus</i> ♂                  | 228          | 216 | 6               | 5  | 2 | 457        | 13               | $2.84 \pm 0.53$  |
| 2. <i>musculus</i> ♀ x <i>musculus</i> ♂                      |              |     |                 |    |   | 7416       | 804              | $10.84 \pm 0.24$ |
| 3. <i>musculus</i> ♀ x <i>bactrianus</i> ♂<br><i>musculus</i> | 106          | 105 | 8               | 3  | 2 | 224        | 13               | $5.80 \pm 1.05$  |
| 4. <i>musculus</i> ♀ x <i>bactrianus</i> ♂<br><i>musculus</i> | 287          | 242 | 18              | 26 | 9 | 582        | 53               | $9.11 \pm 0.80$  |
| 5. <i>bactrianus</i> ♀ x <i>musculus</i> ♂                    | 307          | 258 | 3               | 2  |   | 570        | 5                | $.88 \pm 0.26$   |

The percentage of stillborn in the inbred *musculus* stock (2) is rather high ( $10.84 \pm 0.24$ ) as compared with the 1.3% which King<sup>3</sup>

<sup>1</sup> Feldman, H. W., *Carnegie Inst. Wash. Pub.*, 1926, 337, 49.

<sup>2</sup> Allen, G. M., *Am. Mus. Novitates*, 1927, 270.

<sup>3</sup> King, H. D., *Anat. Rec.*, 1921, 20, 321.

found in her rats. The *bactrianus* mice (1) show a lower proportion ( $2.84 \pm 0.53\%$ ) while the percentage of the hybrids (3) which were born dead is intermediate. This may be the result of small numbers or it may be an indication of the innate vigor of the  $F_1$  fetuses, since Little<sup>4</sup> found significantly fewer stillbirths resulting from human interracial than from intraracial matings. The most illuminating figures are those for the 2 types of back-cross matings (4 and 5 in the table). These two types have the same genetic constitution so the great difference in the percentage of stillbirths ( $8.23 \pm 0.84$ ) must be due to the mother and exhibits the remarkable degree to which heterosis is present in the female hybrid.

## 5154

**Oxydative Blood Destruction and Blood Pigments Protection.**

KONRAD BINGOLD. (Introduced by E. F. Müller.)

*From the Department of Medicine, University of Hamburg, Germany.*

Contrary to the generally accepted idea that destruction of blood pigments occurs gradually it could be demonstrated by newer experiments that any oxydate destruction up to colorless end products may occur directly with the oxyhemoglobin (hematin acid, succinic acid) and that intermediary products (methemoglobin, hematin, porphyrin) do not appear.

This result can be proved: (1) by bacteriological examinations: Using agar prepared with boiled blood, it can be found that the destruction of blood pigments occurs with formation of peroxyd by certain bacteria and with decolorization of hematin. (2) by spectroscopical examinations. Blood containing hematin loses its color instantaneously if combined with  $H_2O_2$ . No intermediary products can be found with spectroscopical examination.

For the assumption of an oxydative destruction two different factors have to be taken into consideration. (1) A protective factor has to be assumed. This must be a product that is close to catalase. According to our last studies very small amounts of fresh blood are sufficient to protect the blood pigments (hemoglobin, methemoglobin, hematin) from an oxydation by  $H_2O_2$ . This protective action can be increased when different media are used. The

---

<sup>4</sup> Little, C. C., PROC. SOC. EXP. BIOL. AND MED., 1919, **16**, 127.