as 28 normal-appearing fetuses. Further, 2 of 14 rats which were allowed to bear their young had 17 living young each. Apparently Engle[3] misinterpreted this report, for he states regarding it, "Immature animals, however, showed superfecundity, but these immature animals were not permitted to carry their young to term so that the number of viable young is unknown."

In experiments relating to the effect of pregnancy on growth we have bred about 100 more rats after the induction of precocious sexual maturity with mare gonadotropic hormone. These rats were given 8 rat units in a single injection at ages ranging from 30 to 33 days and were bred within 72 hours after the injection. In one instance 30, in another 32, and in still another 33 fetuses were found at midpregnancy, though some were in advanced stages of resorption.

The question arises, therefore, as to how many remain viable throughout pregnancy. We previously reported[2] finding 23 living young *in utero* on the 21st day of pregnancy. In the present series the uterus of one rat contained 20 on the 21st day of pregnancy; that of another, 23 living young on the 20th day. One rat (G7474), given 8 rat units on the 33rd day and bred 3 days later, gave birth to 23 living young on the 60th day of age.[4] The young, aside from being small, were normal. Six of these were raised by the mother (we destroyed the others at birth) and averaged 42 gm on the 21st day of age. As previously shown,[5] breeding of these precociously matured rats has no apparent deleterious effect. This particular rat subsequently raised four other litters; the number of young born at each succeeding parturition was 13, 10, 10 and 14, respectively. This rat, therefore, as the result of treatment with gonadotropic hormone while still immature as regards body size, gave birth to approximately twice the average number born under normal conditions. In our colony, the average litter size of untreated rats is 11.5, and 2 litters of 19 among several thousand have been encountered.

On the basis that 33 represents the maximum number implanted and 23 the largest number of young born, it appears that considerable resorption occurs. Evidently, however, not only can superfecundity be produced, but also the number of viable young carried to term can be increased above normal by treating immature rats with gonadotropic hormone. Our results indicate that the maximum prolificacy is obtained by treating rats just before the time of normal maturity.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ADAPTABLE ROTATING UNIT FOR ROLLER TUBE TISSUE CULTURES[1]

To meet the problem of rotating roller tubes in a water-jacketed incubator an adaptable unit was devised. This unit can support either a simple test-tube holder or a Novy jar. By means of the latter a controlled atmosphere can be provided for the cultures.

The rotator is supported by a heavy steel base (A) 18 cm wide and 27 cm long. The inclination of the whole unit can be regulated by means of the screws (B) at the front edge of the base plate. The upright plate (C) supports the rotator shaft (D) by means of the bearings (E). The adaptable holder consists of a circular rear plate (F) joined to an anterior ring (G) by three sturdy supports (H). The three adjustable clamps (L) in the anterior ring hold the test-tube support or Novy jar in place (diagram 2). It is better for the anterior ring to be of a size snugly to fit the anterior lip of the Novy jar rather than for the latter to project, as in the diagram. By means of a standard double stopcock the jar can be exhausted or various gases can be introduced. The same holder can also be employed for an aluminum test-tube rack whose front disc fits a recess in the anterior ring of the adaptable holder (diagrams 1, 3, 4). A much larger test-tube support could be used with a unit having a shorter base plate (A). The rotator is driven by a small electrical motor[2] outside of the incubator

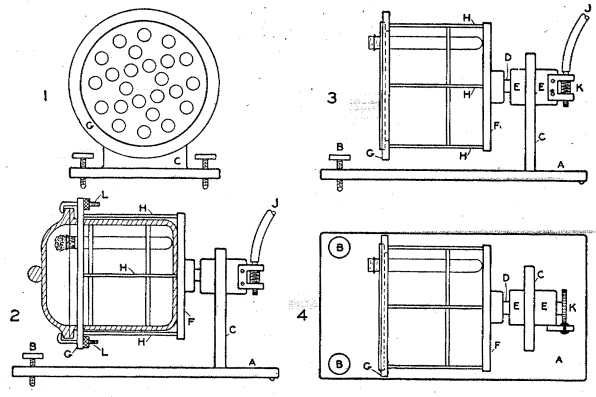

FIG. 1

[3] E. T. Engle, in "Sex and Internal Secretions," Williams and Wilkins Company, Baltimore, 1027, 1939.

[4] A prolonged gestation is frequently encountered in these precociously matured rats.

[1] This investigation was aided by a grant from the Jane Coffin Childs Memorial Fund for Medical Research.

[5] H. H. Cole and G. H. Hart, *Am. Jour. Physiol.*, 123: 589–597, 1938.

[2] Signal Electric Manufacturing Company, Menominee, Michigan. Type C2A 115 AC–DC Amp: 18 W15 Gear ratio 900–1.

connected to the unit by a flexible power cable[3] (J) that passes through the thermometer vent of the incubator. The gear ratio of the motor is 900 to 1. The cable is joined to the rotator shaft by a worm and gear (L) whose gear ratio is 50 to 1. The rotator makes about 10 revolutions per hour.

This arrangement is adapted when only direct current is available and it is necessary to keep the motor outside of the incubator, since heat is generated during its operation. Where alternating current is supplied a small synchronous motor which generates a negligible amount of heat can be attached directly to the shaft of the rotator by a suitable arrangement of gears.

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A PERSONAL FILE OF GEOLOGIC PHOTOGRAPHS

A RECENT note on indexing and filing scientific photographs[1] seems to the present writer to cover only part of the ground, and it would be interesting to learn of the experience of various others. In 1919, the writer, in considering a plan of arrangement and storage for photographs, consulted with several persons in Washington and decided to deviate from the common custom of geologists then with the U. S. Geological Survey, in setting up a personal card file. The plan followed has served well for the arrangement, preservation and use of approximately 15,000 negatives and corresponding prints. Procedure is as follows:

Each lot of field negatives after development is arranged in the order of taking, and for each negative a 4- by 6-inch plain file card is made out with serial number (upper left); date (upper right)—in later experience the possible legal value of exact dates on photographs of water and vegetation has led to recording of the complete date; state or equivalent division (left); locality (right), and title, with as much specific data as may seem desirable. The serial numbers are chronological within any given block or project; but several projects that are carried on concurrently may be allocated to separate thousands, and it is not essential that these number blocks be filled. (Numbers are cheap.) The negatives are numbered and filed each behind the appropriate card. When prints are made, they also are filed behind the cards and are conveniently available for inspection or removal.

In the entire file, three sets of guide cards are used, with contrasting colors. One refers to serial numbers, another to dates and a third to regions or projects. For the use of an individual this chronological arrangement, rather than a strict subject or dictionary rearrangement, seems best, and by means of project and date it is easy to locate any particular series. It is admirably suited to maintaining a complete record of all one's photography, including the portion that may be done for official agencies. In the latter case, the filling out of the data card must likewise be done by the field man, and it may be retained in his personal file with a record print. At the proper time the negative and official prints may be transmitted into the official collection for any desired arrangement, the data being taken from the field man's personal file as originally composed from field notes. The latter work can all be done by office assistants.

Older parts of the file are in steel cases; current blocks are kept in light cardboard file boxes, which may be taken to the darkroom when printing or enlarging is done, or moved about in connection with work on a given project. Handling of field and laboratory negatives in such a file in no way prevents the subject arrangement of a display or file set of prints in the manner suggested by Trefethen, but it is an approach to the earlier, and in the writer's view, the more fundamental problem, the systematic labeling and preservation of original field negatives. This is important, for the scientist especially whose work is for successive agencies but who wishes to preserve the continuity of his own photographic record.

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[3] S. S. White Dental Manufacturing Company.

[1] J. M. Trefethen, SCIENCE, 91: 2349, 24, 1940.

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