

## GENETICS

### DNA and Genes

THERE have appeared new hypotheses<sup>1,2</sup> concerned with the amount of nucleic acid, its relation to the number of genes and its great variation in different animal forms. Without denying their value and validity at all, it seems necessary to direct attention to some facts in this connexion.

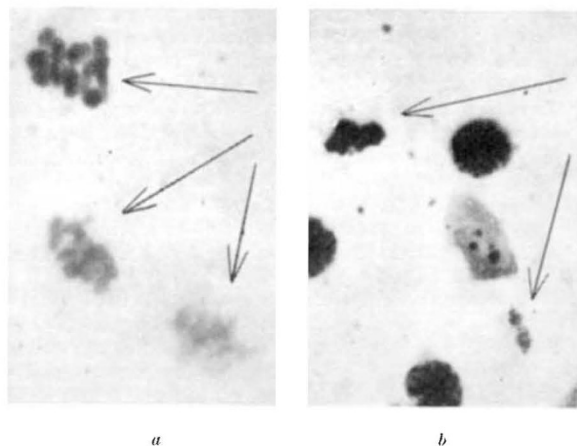


Fig. 1. Squash preparations of mouse testis. For explanation see text.

The two micrographs show variation in the size of the chromosomes and in the intensity of their staining in squash preparations of mouse testis. Fig. 1a shows three neighbouring metaphase plates of the first meiotic division. The darkest (normal) and the lightest differ in their light absorption by a factor of four. Fig. 1b (from a different male) shows the chromosomes in two metaphase plates, and they differ greatly in size (the large one is normal). On the slides the nuclei of each pair were only a few microns apart, and had therefore been subjected to the same treatment. They differ from each other as much as do nuclei from different species.

Although such extreme differences within the same genotype occur very rarely (about 1 : 1,000) they call for caution in relating the amount of Feulgen positive material to the number of genes.

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<sup>1</sup> Atkins, N. B., Mattinson, G., Becak, W., and Ohno, S., *Chromosoma*, **17**, 1 (1965).

<sup>2</sup> Callan, H. G., *Phil. Trans. Roy. Soc.*, **243**, 208 (1960).

## BIOLOGY

### Co-operation of Three Males in Nest Construction by *Chiromantis rufescens* Gunther (Amphibia : Rhacophoridae)

ALL species of the genus *Chiromantis* Peters (Amphibia : Rhacophoridae) have evolved the habit of constructing foam nests over seasonal pools of water. These nests contain up to 200 white eggs (about 2 mm in diameter) which develop through the external gill stage before the nest deliquesces and drips, together with the tadpoles, into the water below.

In August to December 1964, during the first stages of an ecological survey of the Liberian segment of Mount Nimba, it was possible to observe the mating habits of this amphibian. A single nest was observed and photographed

under construction on the night of August 31, 1964. The female was attached to the lamina margin of a large *Harungana madagascariensis* leaf with a single male on her back and two additional males placed laterally. In this position the female produced a small quantity of a pale fawn liquid which all four animals beat into a stiff white foam by swimming movements of their hind limbs. The eggs were produced at the earliest stage of nest construction so that by the time it was completed they were covered and protected by a thick layer of foam.

In May 1966, I returned to Mount Nimba, where I was able to confirm this unusual behaviour in detail. The sequence over seven observed matings was as follows. 1. After heavy rain in the early evening, which filled seasonal pools along forest tracks, males began to aggregate on branches overhanging the water. 2. When up to twelve males had collected in an area of about 2 ft.<sup>2</sup> they began to utter a low infrequent call, the gular fold being extended in two bilaterally symmetrical pouches as described by Schiotz<sup>1</sup>. 3. One or two females approached from a higher level in the vegetation and moved close to the calling males. When the female had approached to within 2 ft. of the males their calling increased in frequency. 4. As the female was approached by a number of males she arranged herself so that she hung vertically from a leaf, which was always directly over the water, however small the pool. The height of the nest above the water varied from 3 to 40 ft. A single male then mounted onto her back. In all cases observed it was the male that called most vigorously that was successful. 5. Two more males now attached themselves to the first male and slowly arranged themselves bilaterally. 6. The male in copula now began to call very rapidly and at the same time squeeze the female rhythmically. All other males in the vicinity now dispersed. 7. In a very short time (5–10 min) the female produced her first foam fluid which all four animals beat into a stiff white foam by swimming movements of their hind limbs. This action was made more effective by the

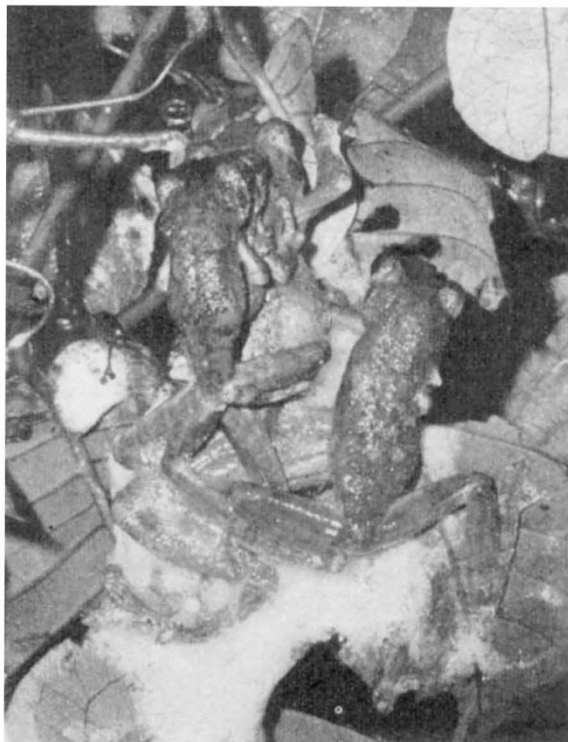


Fig. 1. Female *Chiromantis rufescens* building a nest with the assistance of three males. Note the large size of the female and one male that has arranged himself laterally. A single white egg can be seen close to the webs of the female's left hind foot.