SPECIAL ARTICLES

ORGANIZATION OF HETEROTYPIC CHROMOSOMES

IN a recent article H. C. Sands[1] gives a preliminary account of his interpretation of chromosome structure in *Tradescantia*. This account seems to differ much in fundamentals from the results of a study conducted by the writer on various species of the South African Liliaceous genus *Gasteria*. To consider only the most interesting feature, the heterotypic chromosomes, we find first that at metaphase there are three pairs of small chromosomes in the center of the plate, with four pairs of much larger ones arranged in radiating fashion around them. In favorable material it is easy to see that the metaphase chromosomes are organized internally into chromomeres, though these are somewhat irregularly arranged. Even before they separate the larger chromosomes each show a cleft at the outer end opposite the fiber attachment, and before anaphase is far advanced they are nearly completely divided longitudinally into two halves. Usually this is entirely completed before telophase sets in, and the halves are widely separated. The smaller chromosomes are slow to split, but finally do so. Consequently there is at telophase a diploid number of separate chromosome-halves and the homotypic division has been prepared for.

As the larger chromosomes separate in anaphase it is clear that in each half-chromosome there is a double row of rounded chromomeres. These are few and apparently quite definite in number, well separated from each other and stain sharply in contrast to the almost colorless matrix. As the membrane first appears around the group of telophase chromosomes (which are well separated in this genus and easily studied) it becomes evident that there are no longer two rows of chromomeres, but that four are now present. When the chromosomes are obliquely placed these can clearly be distinguished, especially in the later stages when the chromosomes begin to broaden at the ends in preparation for a more even distribution of the chromatin in the interkinetic nucleus. The smaller roundish chromosomes show comparable changes, though less clearly because of their size. It would seem that this can only mean that both the gametophyte divisions in the pollen grain have been completely prepared for. The chromomeres which enter the construction of the sperm nuclei seem to be already formed and merely awaiting the mechanical distribution of these mitoses. Unfortunately it has not been possible to trace the history of the chromomeres as such through these two divisions.

By a method based on smear preparations it has been possible to largely confirm the results of sectioned material and to obtain fixations in which synizesis (synapsis) has been almost entirely eliminated. The best results on the anaphase and telophase stages were obtained when the dividing cells were pressed from the anther before fixing and embedding.

The writer would consider, then, that the material worked upon, *Gasteria*, tends to demonstrate a very great precision in the chromomere constitution of the meiotic chromosomes. It is hoped that it will be possible soon to make a full report giving the evidence for the views here expressed.

WM. RANDOLPH TAYLOR
UNIVERSITY OF PENNSYLVANIA

[1] Sands, H. C.: "Perigenesis," SCIENCE LVI, 517-518, 1922.

THE INTELLIGENCE OF INDIANS

THE accompanying tables show that if we rank mixed bloods of certain heredity with nomadic and sedentary full blood Indians according to intelligence as indicated by Scale A of National Intelligence Tests the sequence proves to be:

I. Mixed Bloods.
II. Mexicans.
III. Plains and South Eastern Full Bloods.
IV. Plateau Indians, Full Bloods.
V. Navajos and Apaches, Full Bloods.

While the number of cases is small the indications of the measures are consistent with this inference. The results will shortly be reported more in detail by the writer who has been giving these tests in United States Indian Schools of the Southwest.

THE RELATIVE INTELLIGENCE OF INDIANS OF NOMADIC AND SEDENTARY TRIBES AND MIXED BLOOD INDIANS

The scores are of the National Intelligence Tests, Scale A, Form 1.