

fields and will also assist in keeping an accurate record of the areas under improved strains of this variety.

B. S. KADAM.  
M. V. GADKARI.  
G. G. PATIL.

Rice Breeding Station,  
Karjat,  
June 25, 1941.

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<sup>2</sup> Chao Lien Fang, *Genetics*, 1918, 13, 133.

<sup>3</sup> Graham, R. J. D., *Mem. Dept. Agri. Ind. Bot. Ser.*, 1914, 6, 209.

<sup>4</sup> Hector, G. P., Sharangpani, S. G., *et al.*, *Ind. Jour. Agri. Sci.* 1933, 4, 1.

<sup>5</sup> Kashiram and Sarvayya Chetty, C. H., *Ind. Jour. Agri. Sci.*, 1934, 4, 618.

<sup>6</sup> Kikawa, S., *Imp. Uni. of Tokyo*, 1912, 3, 1.

<sup>7</sup> Okada, K., *Rept. Jap. Agri. Assoc.*, 1910, 354, 1.

<sup>8</sup> Parnell, F. R., Rangaswami Ayyangar, G. N., and Ramiah, K., *Mem. Dept. Agri. Ind. Bot. Ser.*, 1917, 9, 75.

<sup>9</sup> Ramiah, K., Jobitharaj, S., and Dharmalinga Mudaliar, S., *Mem. Dept. Agri. Ind. Bot. Ser.*, 1931, 18, 229.

<sup>10</sup> Roschevitz, R. J., *Bull. App. Bot., Genetics and Plant Breeding (Russian)*, English Summary, 1931, 27, 119.

<sup>11</sup> Stok, van der J. E., in *Handbuch der landwirtschaftlichen Pflanzenzüchtung*, by C. Fruwirth, Berlin, 1923.

### THE STRUCTURE OF THE CHROMOSOME

WHILE our understanding of nuclear structure has made rapid strides of advance, there still remains a sharp cleavage of opinion on the question of the structure of the chromosome. Undoubtedly a large measure of this difference is due to the peculiar temptation of some cytologists to deny the validity of visual observation. With improved methods of fixation and staining, Professor Gates and his students have, in recent years, gathered overwhelming evidence in support of the view that the somatic anaphase chromosome is bipartite. Dr. Darlington<sup>1</sup> faces this mass of observational evidence with a bubble theory which in reality is a revival of a conception prevalent in 1911 that anaphase and telophase chromosomes developed vacuoles or alveoli in passing into the resting condition,

Observations on the satellites during somatic mitosis have yielded further crucial evidence in support of the double nature of the somatic anaphase chromosomes. In root smears of *Crocus sativus* stained with decolourised basic fuchsin, Gates and Pathak<sup>2</sup> found during telophase, one of the three satellite chromosomes bipartite with a split satellite.

In the course of my investigations on the somatic chromosomes of the Liliaceous genus *Muscari*, I have found in root smears, cases in which the satellites of one of the anaphase chromosomes was split, demonstrating unmistakably its double nature. One such anaphase is figured here and the long arm of one chromosome can be seen to bear a split satellite at its end, the threads diverging widely apart. This chromosome has a prominent secondary



FIG. 1

Root smear of *Muscari moschatum*

Anaphase showing one of the long chromosomes with a split satellite.  $\times 3600$ .

constriction in the long arm. The split condition of the satellites does not appear often as it depends on critical fixation and the orientation of the chromosome.

K. V. SRINATH.

Department of Botany,  
Intermediate College,  
Bangalore,  
June 14, 1941.

<sup>1</sup> *Nature*, 1938, 141, 371.

<sup>2</sup> *Ibid.*, 1938, 142, 156.