

21 hours.³ This would imply that, while the EDTA-cobalt chelate does not react with any blood proteins, it undergoes at least partial binding in the skin before it is excreted. Similar evidence for a partial binding of this chelate in the bones and the muscles has also been obtained.

The radioactivity dialysing out from the skin in the above instance can be either cobalt-60 in the ionic form or its EDTA chelate or both. In an attempt to identify the exact forms, the dialysate is concentrated to a very small volume and subjected to electrophoresis on paper strips for 150 minutes in a 'Shandon' vertical-type electrophoresis unit using a current of 25 milliamperes and veronal buffer pH 8.3. Under these conditions, while the ionic form stays very much near the point of application, the chelate moves over 1½" towards the anode affording a clean separation. After electrophoresis, the paper strips are dried, the various areas marked, cut into pieces and counted for radioactivity. All the activity dialysed out is

found to be present completely as the EDTA chelate. This supports our view that cobalt-60, administered as certain chelates, moves from one tissue to another in the form in which it is administered—may be in combination with some body constituents, like blood proteins, but never splitting up into the ionic form.

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SOME OBSERVATIONS ON THE CYTOLOGY OF *NICANDRA PHYSALOIDES* GAERTN.

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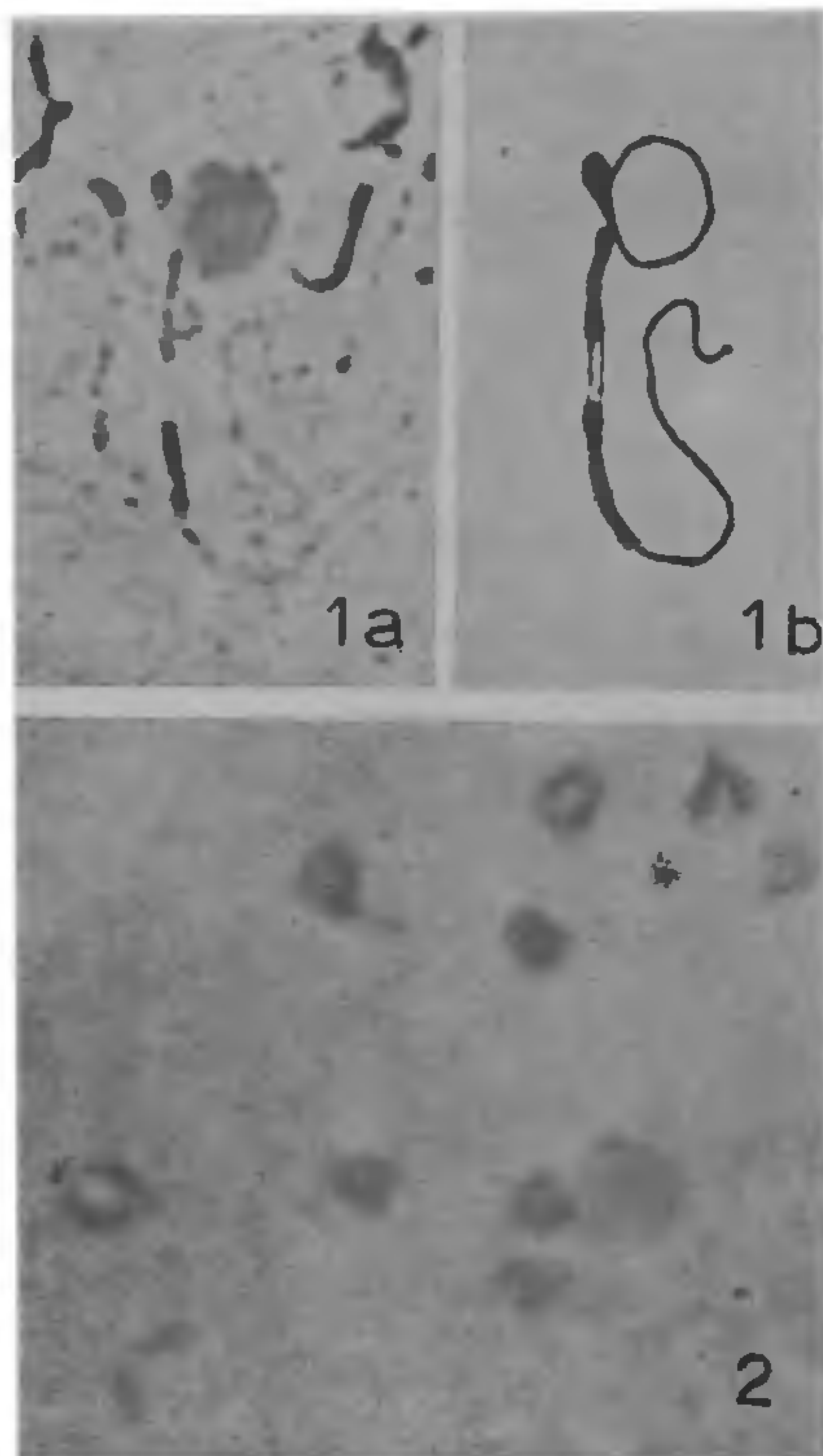
DURING the course of a study of the morphology of pachytene chromosomes in some Solanaceae observations were made on the cytology of the monotypic genus *Nicandra physaloides*, var. *immaculata*, raised from seeds obtained from the Royal Botanic Gardens, Kew, and some deviations from those made by Darlington and Janaki Ammal¹ have been met with which are recorded in this note.

Darlington and Janaki Ammal¹ confirmed the previous chromosome counts of $2n = 20$ made by Vilmorin and Simonet² and Janaki Ammal³ and recorded the occurrence of a pair of isochromosomes with identical satellited arms. These were present in addition to the regular nucleolus organising chromosome pair included in the remaining nine pairs of 'autosomes' such that there were six nucleolus organisers in the complement of the species. The plant investigated by them was therefore interpreted as having "the unique property of being regularly tetrasomic for a part of its chromosomes and

disomic for the rest" at the diploid level. They have also recorded (i) frequent inside pairing of the isochromosomes leading to univalent formation, (ii) irregular distribution of the univalents at anaphase I leading to the formation of microspores and megaspores deficient for the isochromosome and (iii) occurrence of progeny with $2n = 19$ chromosomes derived from the fertilisation of a deficient egg nucleus ($n = 9$) by a normal sperm ($n = 10$).

In the material studied by us it was found that at pachytene there is a single nucleolus organising bivalent attached to the nucleolus (Fig. 1, a and b) and this is the only satellited chromosome pair in the complement. There were no isochromosomes in any of the pollen mother cells examined. The chromosome counts, somatic as well as meiotic, however, revealed the presence of $2n = 20$ and $n = 10$ chromosomes uniformly. Careful examination of sixty nuclei at diakinesis showed a regular formation of ten bivalents in each of them (Fig. 2) and no

univalents were formed in our material. Disjunction at anaphase I was normal with ten chromosomes regularly passing to either pole and cases of irregular distribution of chromosomes were not met with. Progeny with 19 as



FIGS. 1-2. Fig. 1. Part of a pollen mother cell at pachytene showing the single nucleolus organising bivalent in association with the nucleolus, $\times 2000$. (a, Microphotograph; b, explanatory diagram.) Fig. 2. A pollen mother cell at diakinesis showing ten bivalents one of which is attached to the nucleolus, $\times 2000$. (Microphotograph.)

the diploid chromosome number as would result from the fertilisation of a deficient egg nucleus by a normal sperm has not been encountered. This would be the result when no deficient gametes are formed.

The above findings indicate that apart from races having isochromosomes (satellited) included in their complements, races of *Nicandra physaloides* lacking the isochromosomes totally while at the same time not suffering any numerical deficiency in the chromosome number also would occur in nature and meiosis in them would be regular and normal. The material investigated here obviously comes from such plants.

Since in the materials studied by Darlington and Janaki Ammal¹ the nine 'autosomes' include a nucleolus organising chromosome, the satellited isochromosomes are regarded by them as supernumerary but at the same time of great survival value to the organism as they are considered a necessary requisite for the maintenance of the species in time and space. The present material is not only characterised by the absence of the isochromosomes but also by the presence of a pair of chromosomes not encountered by Darlington and Janaki Ammal such that there are ten 'autosome' pairs in all. More recently Sinha³ has recorded the occurrence of a supernumerary fragment chromosome ($2n = 20 + 1$) in the somatic complements of two varieties of *Nicandra physaloides*, viz., *violacea* and *arbitiflora*. Such fragments, if acentric, would be unstable and are likely to be eliminated from the genome with the consequence that the diploid chromosome number would be 20. A study of various geographical races of the different varieties of the species might throw light on the origin of the satellited isochromosomes and fragment chromosomes in this interesting genus.

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* Not seen in original.