and AD, and the largest microchromosome (CD) is also single. The smaller of the single macrochromosomes designated AB ($L^R = 14.27\%$) corresponds to chromosome pair 3 of the homozygous karyotype. The larger (AD) has no counterpart in the homozygous karyotype. It is also a telocentric element considerably larger than AB. The combined relative length of chromosomes AB and CD slightly exceeds that of chromosome AD (AB+CD=20.47%; AD=20.28%).

In our opinion, such a heterozygosity can most reasonably be explained on the assumption of the occurrence of a reciprocal translocation between chromosomes AB and CD giving rise to chromosomes AD and CB. No microchromosome corresponding to the hypothetical small derived microchromosome CB could be identified. Besides the 2 karyomorphs described here, individuals with chromosomal constitution AD/AD, CB/CB should occur. But no further specimens of the species became available.

1 Acknowledgment. We thank Prof. U.S. Srivastava, Zoology Department, Allahabad University, for providing facilities. Financial assistance from CSIR, India in the form of a Senior Research Fellowship to one of us (H.A.A.) is thankfully acknowledged.
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The karyotype of *Microtus cabrerae* Thomas, another species with giant sex chromosomes

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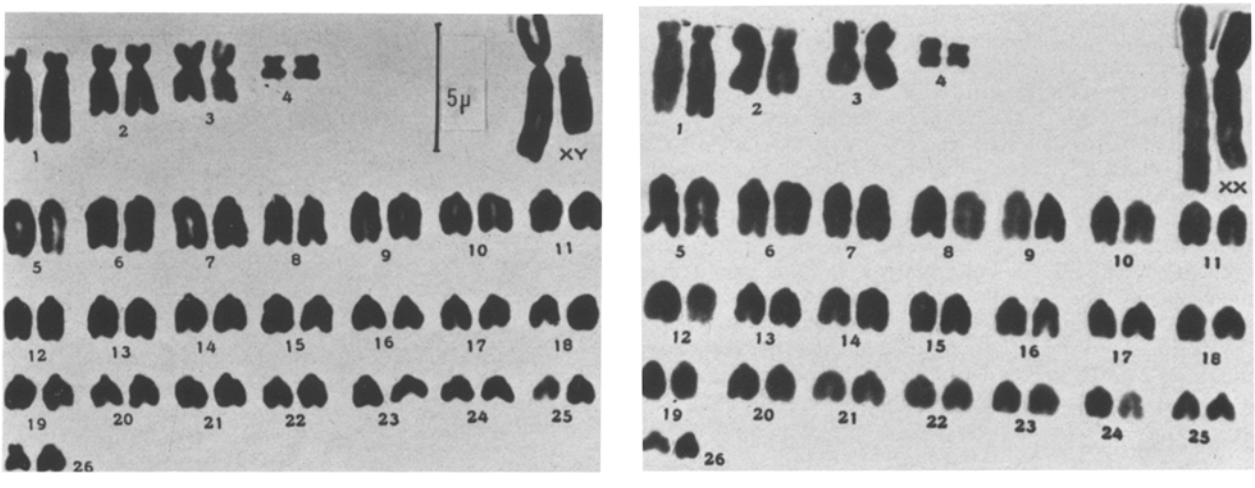
Summary. The karyotype of *Microtus cabrerae,* a species endemic to Spain, is described. It comprises 2n=54 chromosomes, with a 'fundamental number' of 64, and with very large sex chromosomes. An evolutionary relationship between this species and *M. chrotorrhinus* is suggested.

The chromosome complements of species of the genus *Microtus* have been studied mainly by Matthey[1-3] Sachs[4], Hansen-Melender[5,6] and Meylan[7,8]. Some of the species belonging to this genus have not been cytologically analyzed. This report presents observations on *Microtus cabrerae* Thomas, 1906, a species endemic to the Iberian Peninsula, that has not previously been studied.

6 animals (2 male and 4 female), trapped live in the region of Sierra Cazorla (Jaén, Spain) were studied. Somatic metaphases were obtained from bone marrow[9]. From each animal, at least 20 well-spread metaphases were studied. Chromosomes were characterized by the position of their centromeres and classified according to the nomenclature suggested by Levan et al.[10]. Karyotypes were constructed following the criteria given by Tjio and Levan[11].

All the individuals analyzed displayed a diploid chromosome number 2n=54 (figure). Their karyotype consists of 3 pairs of big submetacentrics (pairs 1, 2 and 3) with a centromere index of 4.4, 2.0 and 1.5 respectively, 1-pair of small metacentrics (pair 4), and 22 pairs of acrocentrics showing gradual differences in size. The main feature of the karyotype is the presence of giant sex chromosomes. The X is a submetacentric chromosome with a centromere index of 1.8 and constituting 11.7% of the female haploid



Karyotypes of *Microtus cabrerae* Thomas, 1906, with 2n=54 chromosomes and 'nombre fondamental' = 64. Left, male karyotype. Right, female karyotype.

set (nA+X). The Y chromosome is subtelocentric with a centromere index of 9.4 and a relative length of 6.5% in relation to the male haploid set (nA+Y).

A diploid chromosome number of 2n=54 has been previously described in *Microtus guentheri, M. californicus, M. irani* by Matthey[3] and in *M. nivalis* by Meyland and Graf[7], but these species have normal sex chromosomes. On the other hand, similar giant X chromosomes, of a comparable size and morphology, have been described in *Microtus agrestis* (L.) with 2n=50 by Matthey[1] and in *M. chrotorrhinus* with 2n=60 by Meylan[7]. Concerning the Y chromosome, this element is a giant acrocentric one in *M. agrestis* and *M. chrotorrhinus,* while in *M. cabrerae* it is a subtelocentric giant chromosome. These morphological differences concerning the Y chromosome might be the consequence of a pericentric inversion.

Among the autosomes, the complement of *M. cabrerae* comprises 3 pairs of bi-armed chromosomes (pairs 1, 2 and 3) which do not have an obvious counterpart in *M. chrotorrhinus,* while both species display the same fundamental number, NF=64. According to Meylan[7], *M. chrotorrhinus* and *M. agrestis* arose from a common ancestor which already had giant sex chromosomes and 1 small metacentric autosome (No. 4). In this view, *M. cabrerae* might be derived from an ancestral form with a karyotype similar to that of *M. chrotorrhinus* by 3 centric fusions (Robertsonian translocation) which would account for the 3 pairs of bi-armed chromosomes present in the chromosome set of *M. cabrerae.*

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2/8 translocation in a Japanese Burkitt's lymphoma

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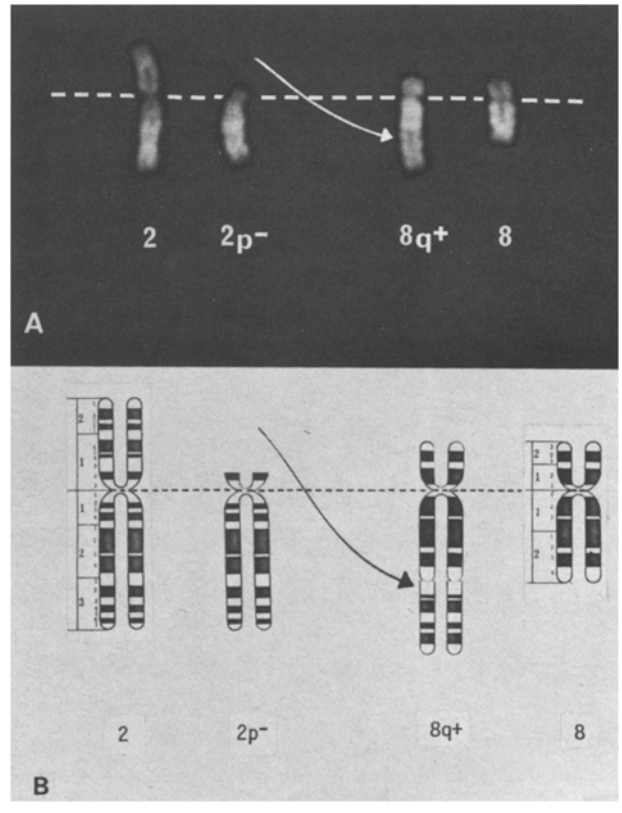
Summary. A new translocation between chromosomes 2 and 8, t(2p⁻; 8q⁺), was found in fresh lymphoma cells from a Japanese patient with Epstein-Barr virus-carrying Burkitt's lymphoma, and in a lymphoma cell line derived from this patient. There was no 14q⁺ translocation, as has been previously described in African and North American Burkitt's lymphomas.

Burkitt's lymphomas, both African and North American, are associated with a specific chromosomal abnormality involving translocation between chromosomes 8 and 14, t(8q⁻; 14q⁺)[2-5]. It has been suggested that rearrangement of 14q is related to abnormal growth of lymphocytes and may be a step toward the development of lymphoid malignancies[6]. We report here a new translocation in an Epstein-Barr virus (EBV)-carrying Burkitt's lymphoma.

As briefly reported[7], the patient was a 29-year-old Japanese male who presented massive ascites and abdominal masses. The majority of ascites lymphoma cells were positive for EBV-determined nuclear antigen (EBNA)[8]. Partial remission induced by combination chemotherapy was soon followed by relapse that progressed to leukemia. The patient died from intestinal perforation 8 months after onset. Histological sections of abdominal tumor revealed undifferentiated lymphoma with a starry sky pattern. An EBNA-positive culture line has been established from ascites lymphoma cells. Cytogenetic studies were performed on cells from this cell line as well as on fresh lymphoma cells from the patient. Slides were stained by Giemsa and quinacrine methods. A bone marrow sample aspirated in the leukemic phase contained numerous lymphoma cells. The modal chromosomal number of marrow cells was 46. Quinacrine-banding revealed a translocation between chromosomes 2 and 8 in 8 of 10 marrow cells. Most of the short arm of chromosome 2 was translocated onto the long arm



Partial karyotype from a marrow cell, showing a translocation between chromosomes 2 and 8, t(2;8)(p12;q24). *A* Quinacrine-banding and *B* diagram of the translocation.