Because of the need to bring out the details of certain of the larger chromosome pairs, Figures 1 and 2 were printed in such a way as to emphasize the 6 or 8 largest bivalents. As a result, the smaller microchromosomes do not appear in these photographs. It was, however, possible to count 37–40 bivalents in these spreads when viewed through the microscope.

The opinion that chromosomes 2 and 3 are involved in this abnormal configuration was arrived at through careful examination of the quadrivalent as found in several birds and by comparison with the normal meiotic complement. The assumption was made that while some rearrangement of chromosomal material has occurred as a result of the translocation all macrochromosomes are still present in abnormal birds. With this assumption in mind, it was possible to identify 4 of the macrochromosomal bivalents (chromosomes 1, 4, 5 and 6). Chromosome 1 was identified on the basis of overall length and chiasmata frequency. Chromosomes 4 and 5 were identified by comparison with number 1 (each being less than half the length of the largest element), and by their appearance as either O- or figure-8-shapes. Chromosome 6 was identified by its size relative to chromosomes 4 and 5 and by its O-shaped appearance. Since chromosomes 1, 4, 5 and 6 were present in their normal bivalent condition it was concluded that chromosomes 2 and 3 were associated in the quadrivalent.

It has not been possible to make a precise determination of which arms of the 2 chromosomes are involved in the exchange nor of the extent of the translocation. However, based on study of the mitotic chromosomes, we believe that the short arm of chromosome 2 and the long arm of chromosome 3 have exchanged material. It also appears that the chromosomal segments exchanged are similar in length.

This is thought to be the first spontaneous chromosomal translocation to be demonstrated in the domestic fowl. By studying the effect of this translocation together with the X-ray induced translocation between chromosomes 1 and 2 described earlier[6] it should now be possible to establish a relationship between 3 of the 6 known linkage groups of the fowl and their residual chromosomes. If such relationships can be established the value of the domestic fowl as an experimental animal in genetic studies should be enhanced. Further, since the chromosomal aberration here described has been isolated in the homozygous condition it may be of some value in commercial breeding operations[7,8].

Résumé. La première translocation chromosomique spontanée observée chez le coq domestique implique un échange réciproque entre les chromosomes 2 et 3.

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Some Considerations on the Evolution of the Karyotype of Microchiroptera

According to previous works of MATTHEY and BOVEY[1], and of BOVEY[2], chromosomal evolution in Chiroptera follows a Robertsonian pattern[3] of centric fusion. Since new techniques are now available[4,5] which can show a larger number of morphological details than was possible by means of gonadal squash, I have made an attempt to study the problem of evolution of karyotype in Microchiroptera, adding more data about the diploid number of species as yet unreported, and improving the knowledge in some species already known by addition of some more morphological details.

A comparison between the karyotypes of 3 Rhinolophidae[5–7] points out their morphological similarity (Figure 1). An example of centric fusion can be drawn from a comparison between the karyograms of *Rhinolophus ferrumequinum* and of *R. hipposideros*. The diploid number of these 2 species differs by 2 units (*R. ferrumequinum* $2n = 58$; *R. hipposideros* $2n = 56$), but a pair of large metacentric autosomes is present in *R. hipposideros* and is to be considered as brought about by centric fusion of 2 pairs of acrocentric large chromosomes. It is of some interest to underline that the peculiarly shaped chromosomes seen in *R. ferrumequinum* (2 pairs of small metacentric chromosomes and 1 pair of acrocentric ones with a heterochromatic zone) are present and morphologically identical in the karyotype of *R. hipposideros* (Figure 2).

A comparison between the karyotype of 4 Vespertilionidae indicated the possibility of centric fusions (Figure 3) in the evolutionary pathway of this family too. The diploid number in these 4 species is a follows: *Miniopterus schreibersii*[2,8] $2n = 46$; *Pipistrellus kuhli*[9] $2n = 44$; *P. savii*[10] $2n = 44$; *Barbastella barbastellus*[2,11]: $2n = 32$.

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[10] E. CAPANNA and M. V. CIVITELLI, Caryologia *20*, 265 (1967).
[11] E. CAPANNA, L. CONTI and G. DE RENZIS, Caryologia, in press (1967).

Fig. 1. A comparison between the karyotypes of 3 bats of the genus *Rhinolopus: R. ferrumequinum* $2n = 58$; *R. hipposideros* $2n = 56$; *R. euryale* $2n = 58$. Only 1 aploid set and the 2 heterochromosomes are represented.

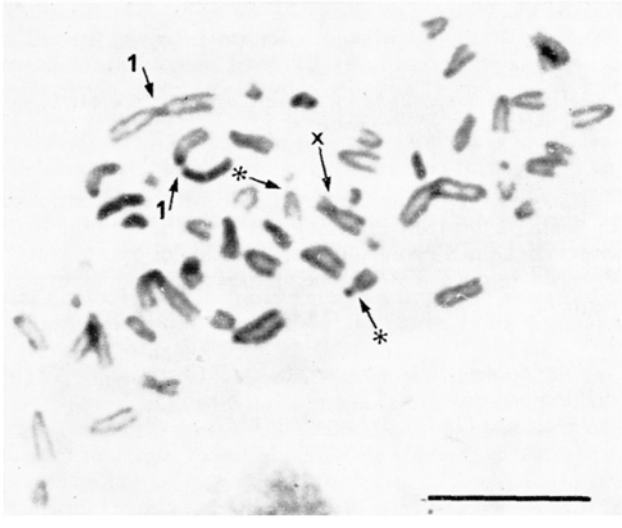

Fig. 2. Metaphase of a somatic cultured cell (spleen) of *R. hipposideros* ♂; 1 indicates the large metacentric autosomes originated by a centric fusion; * indicates the acrocentric chromosomes with an heterochromatic zone. Magnification line at the bottom of the picture 10 μ.

Nevertheless, the number of autosomic arms[11] is the same in all the species, the reason for this being that the large metacentric chromosomes, which I consider as formed by progressive centric fusions of newer and newer acrocentric chromosomes, are increasing in number: 2 pairs in *Miniopterus*, 3 pairs in *Pipistrellus*, 9 pairs in *Barbastella*. In addition, the 4 karyograms display some peculiar morphological identities: each of the 4 species displays a pair of metacentric middle-sized chromosomes (2 μ) and 2 pairs of punctiform ones. In 2 species of *Pipistrellus* I pointed out a pair of acrocentric chromosomes with an heterochromatic zone, which were morphologically similar in the karyogram of the 2 species.

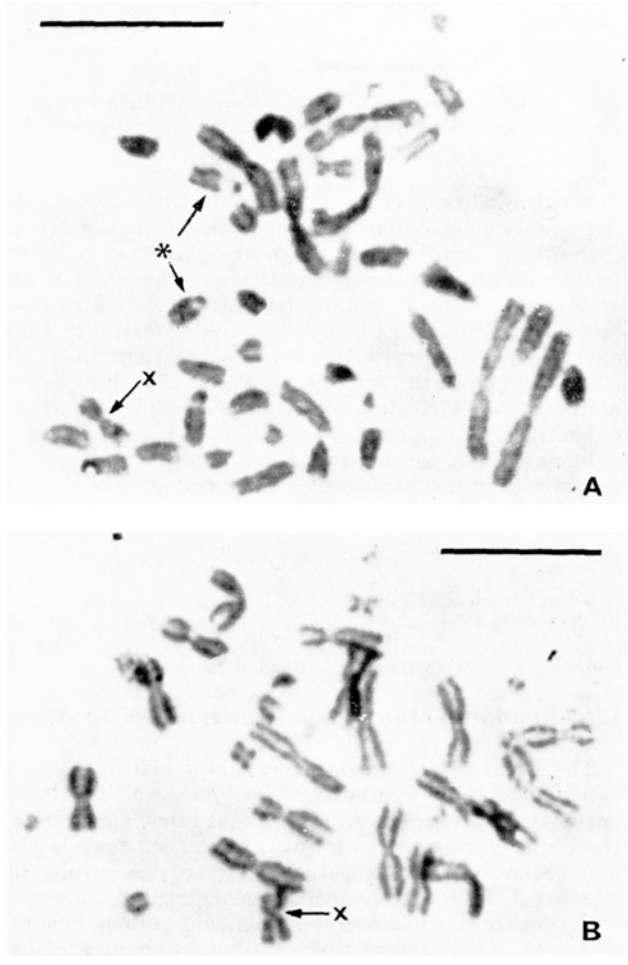

Fig. 4. Somatic methaphases of cultured cells (spleen) of *P. kuhli* (A, on top) and of *B. barbastellus* (B, at the bottom). Both cases are ♂; X indicates the heterochromosome *X*; * indicates the acrocentric autosomes with heterochromatine. Magnification line on top of the pictures 10 μ.

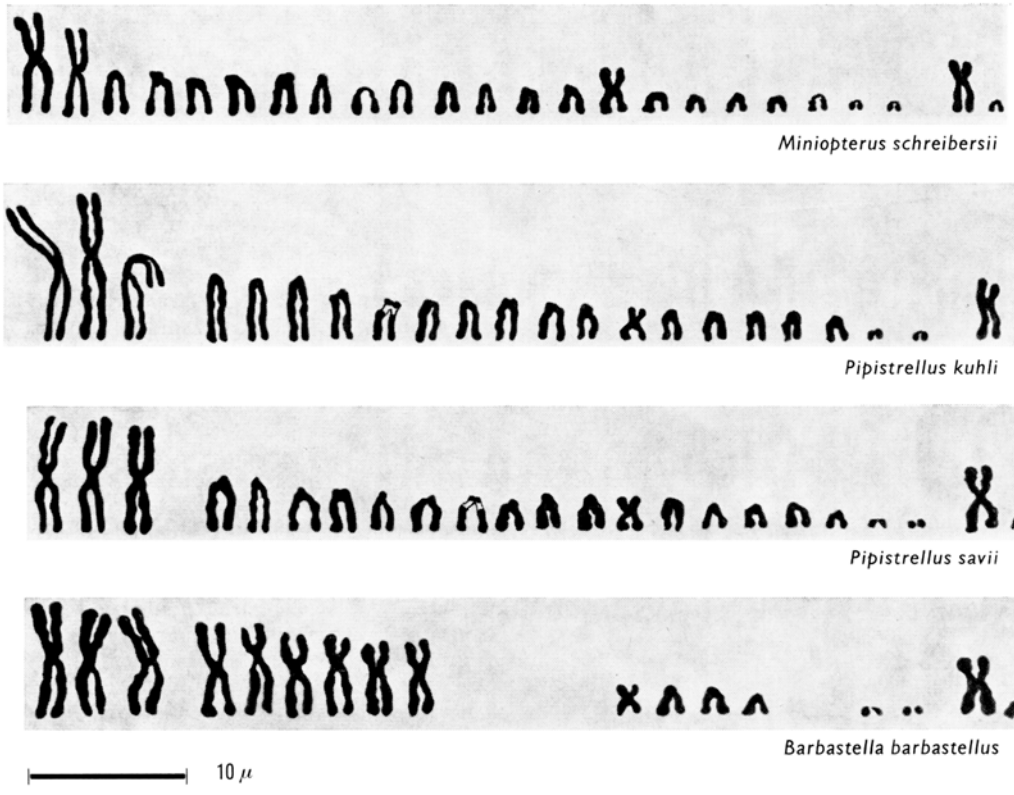

Fig. 3. A comparison between the karyotypes of 4 Vespertilionidae: *Miniopterus schreibersii* $2n = 46$; *Pipistrellus kuhli* $2n = 44$; *P. savii* $2n = 44$; *Barbastella barbastellus* $2n = 32$. Only 1 aploid set and the 2 heterochromosomes are represented.

A recent work of B. DULIC et al.[12] further supports the hypothesis of evolution by centric fusion in the Microchiropteran karyotype. The authors report that in *Nyctalus noctula* the diploid number is $2n = 42$ but the amount of autosomic arms is still 50. In fact there are 4 pairs of large metacentric autosomes. Moreover DULIC identifies all the morphologically peculiarly shaped chromosomes which I found in the 2 species of *Pipistrellus*, besides the morphological identities which I reported in Vespertilionidae.

In conclusion, we may therefore think that the chromomic mutation mechanism of centric fusion is implied in the evolution of karyotype in Microchiroptera.

Riassunto. L'esame condotto dall'Autore sul cariotipo di 7 Microchirotteri (3 Rinolofidi e 4 Vespertilionidi) fa ritenere che nell'evoluzione del cariotipo di questo sottordine sia implicato il fenomeno robertsoniano di fusione centrica.

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[12] B. DULIĆ, B. SOLDATOVIĆ and D. RIMSA, Experientia *23*, 945 (1967).

ACTUALITAS

Life-Span and Membrane Properties of Erythrocytes

The experimental data showing that in mature erythrocytes there is no synthesis of enzymes and that their enzymatic activities have, at different rates, an exponential decay during their life-span, have been reviewed[1–4] and it seems very probable that the life of the erythrocyte is primarily limited by the depletion of glycolytic enzymes.

Recent studies, however, on the membrane components of erythrocytes suggest that even slight changes in the physicochemical properties of the membrane have an important effect on the life-span of red blood cells. Internal, as well as external factors, can be responsible for the membrane change and ultimately for the erythrocyte removal from the circulation.

The negative charge on the erythrocyte surface is due to the carboxyl group of sialic acid[5–7] and, according to HAYDON and SEAMAN[8], probably also to the α-carboxyl group of a protein-bound amino acid. Sialic acid is a component of a glycoprotein located on the red cell membrane[9–11], and it would seem, following MORAWIECKI's proposal[12] consonant with WINZLER's et al. results[13], that the lipophylic portion of this glycoprotein is associated with the lipid bimolecular leaflet layer of the membrane, while the remaining hydrophylic portion emerges into the aqueous environment of the cell. There are, however, several considerations based on the electrophoretic behaviour of erythrocytes, strongly suggesting