statu nascendi". On this basis it is possible to get sympatric speciation resulting from chromosomal mutations. This theory contradicts one proposed by Mayr[20], who claims that groups require to be geographically isolated from each other before speciation can occur.

Intra-specific chromosome polymorphism was reported previously in *Gerbillus pyramidum*[21] and *Acomys cahirinus*[22]. However, hybridization experiments revealed that there are reproductive barriers between the different cytogenetic types, which indicates that an advanced stage in speciation has been reached by both groups[23].

In a study of some species of *Acomys*[23], Matthey observed two chromosome numbers in the members of a race of *A. minous*. A metacentric chromosome was found to be the cause of the difference; this would appear to represent a more complicated type of polymorphism than that explained by the Robertsonian type.

Centric fusion of telocentric chromosomes is a common characteristic of neoplastic tissues[24] and is frequently found in cells in tissue culture[25–26]. As outlined by White[8], and also pointed out by Ohno *et al.*[25], a translocation of this type is of adaptive significance because new gene complexes are formed with different recombination values relative to the position of other gene loci. Little or no loss of genetic material is thought to occur and the number of chromosome arms is constant as is the DNA content per nucleus.

The Robertsonian type of chromosome translocation which we have described in cattle is the first example of this type of rearrangement observed in domestic animals.

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Cuticular Structure in the Phalangida

APART from passing references such as that of Kastner[1] to the cuticle of *Trogulus*, there is no information about the cuticular structure of the Phalangida. Histological investigations of the cuticle in three species of the Palpatores revealed a marked difference between the cuticle of the dyspnoic *Nemastoma lugubre* (Mull) and the two eupnoic species *Leiobunum rotundum* (Lat.) and *Phalangium opilio* Lin.

In the two eupnoic species the situation is closely comparable with that of insects[2] and scorpions[3]. In cuticle with an overall thickness of 14μ there is an endo-cuticular component 9μ thick and an exo-cuticle 4μ thick. The boundary between these two components is sharp and comprises an area which has little affinity for aniline blue, orange *G* or acid fuchsin. It is perhaps comparable with the amber, or quinone tanned, exo-cuticle of scorpions[3,4]. The endocuticle differs from the relatively homogeneous exo-cuticle in its laminate structure. These laminae have a strong affinity for aniline blue and a slight residual affinity for acid fuchsin. In addition to these two major components there is, on the sclerites, an epi-cuticular layer corresponding to the cuticulin of the epi-cuticle in scorpions. This is bordered externally by further thin epi-cuticular components.

In the arthrodial membranes the exo-cuticle is absent and they comprise a 2μ heterogeneous epi-cuticular component overlying the strongly laminate endocuticle which is uniformly stained by aniline blue.

In contrast the thick cuticle of *Nemastoma lugubre* comprises numerous laminae which are closely and regularly packed in the external 3·5μ but less so in the internal 19μ. In neither of these regions do the laminae have any marked affinity for the foregoing stains. The most internal laminae do, however, have a slight positive reaction with acid fuchsin. Throughout the body the external closely packed laminate region contains the melanin which gives the species its characteristic colour. This is only lacking in the region of the two white spots.

In general the staining reactions of the arthrodial membranes, in which the epi-cuticular component is acid fuchsin positive and the endo-cuticular component aniline blue positive, compares with the condition in other arthropods. In view of the fact that the endocuticle of *Phalangium* and *Liobunum* is also aniline blue positive with a residual affinity for acid fuchsin, it would seem that sclerotization only affects the exo-cuticle. The limitation of the acid fuchsin positivity in *Nemastoma* to the innermost lamina suggests that in this genus which, together with the Cyphophthalamae, Laniatores and Trogulidae, has long been known from superficial inspection to have a harder cuticle, this hardening is associated with the sclerotization of the entire thickness of the cuticle. It is further seen that in all three species the endo-cuticular component of the sclerites with its loosely laminated structure is more closely similar to the structure of the endo-cuticular component of the arthrodial membrane than is the case in scorpions where the laminae of the arthrodial membrane are more marked in adult animals than are those of the endocuticle.

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'Wavy–Fused' Mutants in the Medaka, *Oryzias latipes*

AIDA[1] first reported the occurrence of *wavy* and *fused* vertebral mutations in the medaka. These characters are simple recessive to normal and are independent of all known genetic characters and sex. The vertebral column of the *wavy* fish curves dorso-ventrally (Fig. 1 *B*) and some centra of the *fused* fish are fused (Fig. 1 *C*). Fig. 1 *AD* show the backbones of normal and *wavy–fused* fish. Recently, Takeuchi[2] also reported a *wavy* mutant of the medaka which had appeared in the breeds of Yamamoto in Nagoya University and this mutant was used in the present experiment. Although the *wavy* mutant is a simple recessive, the way in which it expresses itself suggests the presence of modifiers of the principal gene. The *fused* mutant used here originally appeared in Aida's breed and has been kept in the laboratory of Yamamoto (Nagoya). A detailed