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den Zeckenbiß allein als auch durch die Abgabe infektiöser Coxalflüssigkeit erfolgen kann (vgl. Abb. 20 D), und zwar übertragen

1. *Zeckennymphen*

a) durch den *Biß,* wobei die Spirochaeten mit dem Speichel direkt in die Wunde injiziert werden.

b) durch die *Coxalflüssigkeit,* wobei die Erreger in die Bißwunde geschwemmt werden oder durch die unverletzte Haut eindringen können.

2. *Adultzecken*

a) durch die *Coxalflüssigkeit* (wie oben)

b) durch den *Biß* via Speicheldrüsensekret (selten).

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Summary.

After a detailed description of the anatomy of *Ornithodorus moubata,* the presence and behaviour of the agent of African relapsing fever, *Borrelia duttonii,* in the tick is discussed, as far as its transmission to warm-blooded animals. The results obtained are summarised in tables 20 A-D as follows:

1. If a tick sucks the blood of an infected man or animal (see fig. 20 A), the spirochaetes are carried with the absorbed blood via the pharynx (Ph) and oesophagus (Oe) into the middle intestine (MD), e.g., stomach, in the cavity of which they are found in continually decreasing numbers during 16 days. A few hours after the tick's feeding the agents already begin to gather on the periphery of the gut wall, attacking its epithelium cells and boring through the strata of the gut wall. At the earliest after 24 hours they penetrate the body cavity fluid (see fig. 20 B).

The development cycles (granulae) of *Borrelia duttonii* described by *Dutton & Todd, Leishman* and other authors cannot be seen either in the gut contents or in the gut wall. From the beginning of infection there are certainly, in the contents of the gut, a few and later more and more immobile, degenerated spirochaetes, but these are dead forms, incapable of developing and which have nothing to do with development stages.

2. In the haemolymph, shortly after the first arrival of the agents, a considerable multiplication of spirochaetes generally takes place. Their number and the time of occurrence varies, however, from tick to tick. This multiplication of the agents is due on one hand to division of the forms already in the body fluid; on the other hand to the continual liberation of fresh spirochaetes from the gut wall.

3. From the haemolymph the agents of relapsing fever infiltrate the various organs of the tick and their presence is proved at the earliest on the third day in the salivary glands (Sp), in the coxal organs (Co) and also in the central ganglion (Ce); in the Malpighian tubes on the fourth day (see fig. 20 C). The cavity of the last named organs and also the anal excretions of the tick remain constantly without spirochaetes. The central ganglions, the coxal organs and the Malpighian tubes in the nymph as well as in the adult tick are centres in which the spirochaetes multiply by simple and by multiple transverse division. *Borrelia duttonii* behave differently in the salivary glands: only the glands of nymphs show a strong permanent infection. The glands of the adult tick, how-