

and the respiratory quickening caused by colored light. This was taken to prove concomitance between quickening of breathing and agreeable feeling.

The mass of entirely conflicting evidence hitherto discovered, which relates to the last conclusion, however, continues to stand and to negate the validity of the conclusion which the author rather emphatically gives it. The conclusion is rendered still more unwarrantable by the evident fact of the failure in the experiments herewith reported to exclude external and manifestly disturbing stimuli; and by the further fact that the number of records upon which the conclusion is based are comparatively few. A. A. FARLEY.

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*Die Orientierung der Brieftauben.* G. H. SCHNEIDER. *Zeitsch. f. Psychol. u. Phy. d. Sinnes.*, 1905, XL., 252-279.

In a note appended by the editor of the *Zeitschrift* to the above article, it is stated that Dr. Schneider had intended using the results there communicated in a second edition of *Der Thierische Wille*. Owing to the death of Dr. Schneider a second edition of this book was apparently never completed. It is impossible to make out from the article itself just when Dr. Schneider completed this work. He apparently began it in 1886. The author gives only five references to the literature—the most recent of the five bearing the date 1878. No mention is made in the paper either by the author or by the editor of the rapidly increasing modern literature on this subject.

The experiments are concerned mainly with the education of young carrier pigeons and with the short flights of adults. The question he sets out to prove is this: are the pigeons guided by an inborn sense of direction, which is unknown to us? Or are they guided by the eye? And if the latter supposition is assumed to be true, how are they influenced by topographical relations?

Dr. Schneider's method of experimentation was essentially like that adopted by all other investigators of the pigeon's behavior in distant orientation. The birds were transported in a basket by carriage or rail to the desired distance and were there released one by one. The time of the release, state of the weather, number and characteristic markings of the bird, were all carefully recorded. Trustworthy boys stationed at the côtes recorded the time of the return.

The experiments were made chiefly in and around Pössneck. The distances used were very short—from 3 km. to 42 km. Certain experiments were made to determine the relative ease of orientation between releases made in valleys and on mountains.

His conclusions are numerous, the one of chief interest being as follows: "The assumption that the carrier pigeons possess an inborn sense of direction is an error; for if this assumption were true, then the young pigeons ought to find their way equally well. The investigations have shown, especially those at Könitz, that young pigeons, even at relatively small distances from their home, have the greatest difficulty in finding their way back when the vicinity is at all strange to them, and their home cannot be directly seen." He then concludes that the young birds utilize, in their early flights, the familiar groups of houses, mountains, etc., and that the distances to which a bird may be taken and return may be increased commensurately with the increase in the development of his 'topographical memory.' The author believes that the pigeon can develop not only 'Erinnerungsbilder' but even 'Gedächtnisse.'

Dr. Schneider does not discuss the more difficult feats of the carrier pigeon. He says nothing of their long flights over the ocean. He says nothing of the so-called 'voyaging' pigeons of France. These birds travel over the continent in wagons. A stay of one or two hours in a town enables these pigeons to return to it. He has missed the point in the arguments of those who hold that there are factors in distant orientation which are not explicable by visual sensation or even visual memories. In the first place nobody, we believe, would deny that the pigeon uses vision where he can. And again, it is a mistaken use of the term 'sense of direction' to assume that it does not have to develop. Consequently we should not expect the young birds to return as well as the adult. The term 'sense of direction' is used by careful writers with the implication that there is a definite psychophysical possibility of its being developed—just as there is a definite psychophysical possibility of visual sensations being developed.

In conclusion, we may say that if the article under consideration was published out of respect to the memory of Dr. Schneider, the space allotted to it in the *Zeitschrift* was well used. But if the editor of that journal thought the article would contribute to our knowledge of the factors in distant orientation, or that it was even a good résumé of the facts already obtained, he was laboring under a misapprehension. The article should not have been published under any circumstances without someone's bringing the literature up to date. Had this been done it could then have been shown that Dr. Schneider independently reached certain conclusions which would have been of value if they had been made public at the time of their discovery.