of the department to fill the vacancy caused by the death of the late Professor Charles Baskerville.

DR. GEORGE DOCK has resigned his position as professor of medicine at Washington University Medical School, St. Louis.

AT Columbia University, Dr. James P. Southall, physics, and Dr. James Kendall, chemistry, have been promoted to professorships. Dr. Robert H. Bowen, zoology, Dr. Roy J. Colony, geology, Dr. John A. Northcott, mathematics, and Dr. Hugh Findlay, agriculture, have been promoted to assistant professorships.

PROMOTIONS in psychology and educational psychology at Columbia University are announced as follows: At Barnard College, Dr. H. L. Hollingworth to a full professorship; at Columbia University, Dr. A. T. Poffenberger to an associate professorship; at Teachers College, Dr. Arthur I. Gates, Dr. William A. McCall and Dr. Leta S. Hollingworth to associate professorships.

DR. EDWIN G. BORING and Dr. Herbert S. Langfeld have been appointed associate professors of psychology at Harvard University. Dr. Boring has since 1919 been professor of experimental psychology at Clark University. Dr. Langfeld has been promoted from an assistant professorship.

## DISCUSSION AND CORRESPONDENCE

### DECEREBRATION IN BIRDS

THE recent observations of Shaklee[1] on decerebrate pigeons serve to emphasize some features of the physiology of the central nervous system of special interest to workers in this line. The long period of survival—nearly twelve months—and the new features of decerebrate behavior recorded, again call attention to the possibilities of this method of experimentation as well as to some of the dangers of its interpretation.

The positive result of the return of the drinking reaction, not hitherto obtained in similar work, points to a greater flexibility in the neural mechanism than we have usually ascribed to it and falls into line with some of the newer conceptions that have been gaining foothold in the field of brain function. Whatever interpretation of the results may be made regarding the process by which such restoration of function is accomplished, everyone must be impressed by its extent and adaptative importance.

The differences between the present work and the results of Martin and Rich[2] to which Shaklee refers deserve a word of comment. Aside from the difference in species used, which may or may not have influenced the results, it should be emphasized that Martin and Rich operated on newly hatched chicks, thus excluding the influence of individual habit or experience prior to decerebration, while Shaklee used adult pigeons. Another factor is the distinctly longer period of survival in the pigeons.

The highly speculative interpretation placed upon these very interesting results may be passed over with the exception of one or two points. It seems surprising that, if the arc upon which the drinking reaction depends is of the deeply ingrained type postulated, it did not show activity for 32 days. In considering the feeding reaction the importance of taste seems strangely overstressed. A hard grain in the tip of the beak could give rise to very little more taste than do the bits of gravel which are also normally swallowed by birds.

The interpretation of work of this nature must be cautious. The facts of re-education (I use the term without implication as to the method by which restoration or substitution is accomplished) in man and animals show that many things can be done which are never normally done in the lives of the vast majority of the individuals or of their ancestors. As when storms damage telephone and telegraph lines, communication can be effectively established by routes never normally used, so in the nervous system possible and efficient arcs and

[1] *Am. Journ. Physiol.*, Vol. lv, p. 65, 1921.

[2] *Am. Journ. Physiol.*, Vol. xlvi, p. 396, 1918.

pathways may exist which are never normally traversed.

Only one explanation of the restoration of function is offered in the article under consideration, *i. e.*, that the subcortical arcs are the more primitive and are sufficiently retained in adult pigeons after decerebration to make possible the carrying out of normal drinking reactions.

Another explanation is also possible. Many writers have claimed that certain habits, arising in the first instance through activities involving the cortex, later are passed on completely to subcortical centers. As Herrick[3] points out, these acquired automatisms may so closely resemble inherited reflexes as to be indistinguishable in the absence of the history of their development. If it is here assumed that the drinking reaction established during the life of the pigeon is transferred in large part to subcortical structures, its retention after decerebration would seem to be expected, while in the case of the chick, decerebrated before such reactions were built up, no such appearance could be looked for. It might also be argued that the feeding reaction, being more complicated, was not so completely transferred from the cortical region as to be effective after decerebration.

That such an assumption may be justified is indicated by the work of Franz and Lashley[4], who found from numerous careful experiments with white rats that extensive cortical lesions did not usually affect the retention of most habits due to previous training, nor did they prevent the formation of new habits. The authors also report that in the cat and monkey where the frontal portion of the cortex is normally utilized in the formation of certain habits, these habits, if long practiced, are still carried out in the ordinary way after the ablation of the frontal cortex. This work as well as its continuation by Lashley[5] clearly shows that the classical picture of the decerebrate animal is in large measure erroneous and must be carefully revised and with it the entire conception of the physiology of the central nervous system. Any contribution to this promising and important field is to be welcomed.

[3] *Introduction to Neurology*, 2d ed., p. 336.

[4] *Psychobiology*, Vol. 1, p. 71, 1917.

[5] *Psychobiology*, Vol. 2, p. 55, 1920.

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## THE BITE OF LACTRODECTUS MACTANS

IN SCIENCE for January 13, F. R. Welsh writes on "Poisonous Spiders." In regard to the "Black Widow," *Lactrodectus mactans*, he quotes Dr. McCook as of the opinion that the bite of this spider is "in most instances of small consequence." During the past two years the writer has had called to his attention four cases of attacks by this spider on human beings. These were all reported by practising physicians who sent in the spiders for identification. All four cases were those of men who were bitten on the penis while using outside closets. In every case the results were of a very serious nature. The patients suffered intense pain accompanied by severe abdominal disturbances, convulsions and delirium. In one case the abdominal pain was so intense and pronounced that the patient who had been sent to a hospital in a distant city was, upon arrival, promptly operated upon for appendicitis. The severe symptoms lasted from twenty-four hours in one man to over a week in the case of another. In a third case the physician reported four days after the patient had been bitten that he was "not yet out of danger." However all ultimately recovered. Two of these men were bitten the same day in the same closet and presumably by the same spider, indicating that the spider does not exhaust her venom by one bite.

These experiences would indicate that the bite of this species, at least when administered in a tender part of the body, is very serious, exceedingly painful, and even dangerous.

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## WATER-IMMERSION OBJECTIVES

I WISH to call the attention of those biologists who use the microscope to the value of the much neglected water-immersion objective. Its inferiority to the oil-immersion in the matter of numerical aperture, and consequently in power of resolution, has led many microscop-