

a theory of *Biogenesis*. We are told on page 236 that the name was given to express the idea 'that the origin of the complex organism is to be explained from the properties of an elementary being, the cell.' If only it did express this!

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*Animal Intelligence*. By WESLEY MILLS. New York, The Macmillan Co. 1898. Pp. x + 307.

The first fifty pages of Professor Mills' book are made up of certain theoretical discussions. The rest consists in the main of reprints from the *Transactions, Royal Society of Canada*, already familiar to those who follow the progress of animal psychology. In his theorizing Professor Mills refuses the moderate attitude of Lloyd Morgan, Wundt and other recent psychologists and reverts to a position comparable to that of Romanes. He even calls Lindsay's writings 'admirable.' Here is no place to refute his claims; it will suffice to say that he leaves the problem in the loose and unprofitable form of more or less 'intelligence' instead of resolving it into definite questions about the presence or absence of particular mental processes. Moreover, he wastes his energy on such straw men as the theory that all the actions of animals are due to instinct or that human minds were created especially of quite different stuff. One novelty in his discussion is the insistence that human conceit makes men under-rate animals' capacities. When one thinks of the wide prevalence of animal-worship, of the reverent eulogies of instinct so common in books of the middle of this century, or of his own experience of present opinion about animals, this notion of Professor Mills seems extraordinarily perverse. I should say that we naturally tend to do quite the opposite, to interpret animals' acts by our own minds, and, when any strange act appears, to explain it in the most glorified way possible.

The observations which are recorded in the book concern the habits of squirrels, hibernation, and the early life of dogs, cats, rabbits, guinea-pigs, pigeons and chicks. Such records are of the greatest value, and to Professor Mills is due the credit of doing more of such work, I sup-

pose, than any one else has yet done. The development of the sense-powers, the presence of instinctive reactions of various sorts, the correlation of physical growth with mental development, the formation of habits—data concerning all these are given. One could praise them unreservedly were it not for Professor Mills' habit of occasionally mixing up opinion with observation. On page 139, for instance, he says: "I notice that the precocious bitch acts towards the whip much as an *old dog* or a half-grown one often does. This is difficult to describe. The animal shows that it understands what its relations are, but seems to combine a sort of pleading with humor." The last sentence is a good record of Professor Mills' attitude toward animal psychology, but it is worthless as far as concerns the dog. In harmony with his general theory Professor Mills finds in these young animals signs of reasoning, a moral sense and a sense of humor. Many would interpret these signs very differently.

In closing I wish to say a little about the observational method of studying animal psychology. Without forgetting a single one from among its advantages, the fact remains that, unless you practice continuous observation from birth, you do not get complete control of the animal's experience. Actions which you observe in one hour out of the twenty-four may be due to experience acquired during the remaining twenty-three. The meaning of phenomena is also often dubious. Why then neglect specific experiments, even if you have to use unnatural surroundings? It would seem that if Professor Mills had used a part of his time in making crucial experiments to decide definite questions, he would at least have had a means of checking his other results. Finally, I would beg that anyone who is studying animal psychology to throw light on the human mind, to leave the poor dogs and cats and guinea-pigs and above all the favorite chicken, to feel their feelings in peace and devote himself to the monkeys. Since Hubrecht has shown how early the primate stock split off, it seems far-fetched to call a dog-mind and cat-mind an ancestor in any sense of the human.

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