

Though the meeting, at which the award was announced, was a special session, called at the time when the society is usually in vacation, a large attendance was present. A program of exceptional interest was carried out. Prof. Willis J. Beecher presided. In an introductory address he briefly stated the purpose of the meeting and the history of the medal. Mr. Frank W. Richardson, on behalf of the Committee appointed to receive and administer the medal, announced acceptance of the trust and the award for 1904 to General Clark. Dr. William M. Beauchamp of Syracuse, an eminent authority upon Iroquois matters, gave a carefully prepared address in which, after emphasising the important place of the Iroquois among American Indian tribes, he expressed his satisfaction at the founding of the Cornplanter Medal and sketched General Clark's labors in the Iroquois field. Frederick Starr then informally stated the plan and history of the medal and added a word of personal appreciation regarding General Clark and his work. During the program, Jesse Lyon, Honuses, an Onondaga chief, sang several Indian songs to the accompaniment of rattle and drum. At the close of the addresses, Albert Cusick, Sagonaquaten, Onondaga and one time head-chief of the Iroquois Confederacy, made a brief address and gave General Clark an Onondaga name, *Hahahcsuks*, "the Pathfinder," at the same time leading him back and forth before the company, chanting the ancient formula of adoption. General Clark made a brief response after which Gen. William H. Seward, Jr., extended a vote of thanks to those who had been interested in the founding of the medal.

The Cornplanter Medal is to be permanently endowed.

FREDERICK STARR.

DO ANIMALS THINK?

BY LORD AVEBURY.

From his life-long and conscientious study of ants Dr. Forel is peculiarly qualified to write on such a subject; while from his position at the head of a great lunatic asylum he has had exceptional opportunities, of which he has ably availed himself, for the study of mind in various phases.

At first sight it might seem as if insects were hardly likely to throw much light on psychic problems. Nevertheless, if the dog and the elephant are in some respects pre-eminent, and if in bodily structure the anthropoid apes approach nearer to man than do any other animals, yet, when we consider the habits of ants, their social organisation, their large communities and elaborate habitations, their road-ways, their possession of domestic animals, and even in some cases of slaves, it must be admitted that they have a fair claim to rank next to man in the scale of intelligence. However this may be, Dr. Forel has selected insects, and especially his favorite ants, as the subject of his present memoir.

Many seem to solve the problem to their own satisfaction by saying that animals act by instinct and man by reason. I wish he did! How much happier and better the world would be! But in fact the subject is much more complex. Others believe, or think they believe, that their pets, and especially dogs, are as intelligent as man.

Many again seem to entertain two entirely opposite and contradictory opinions. I often hear people say that their dog, for instance, can do every-

thing but speak. But when I ask whether it can realise that two and two make four, which is, after all, a very simple arithmetical calculation, much doubt is generally expressed. That the dog is a loyal, true, and affectionate friend all will gratefully admit, but when we come to consider the psychical nature of the animal the limits of our knowledge are almost immediately reached.

I have elsewhere suggested that this arises from the fact that hitherto we have tried to teach animals rather than to learn from them, to convey our ideas to them rather than to devise any language or code of signals by means of which they might communicate theirs to us.

The difficulty of determining the intelligence of dogs is increased because they are so quick in seizing any indication given them, even unintentionally. This is well illustrated by an account Sir William Huggins gave me of a very intelligent dog, appropriately named Kepler, belonging to him. A number of cards were placed on the ground, numbered respectively 1, 2, 3, and so on up to 10. A question was then asked—the square root of 9 or 16, or such a sum as 6 plus 55 minus 3.

Sir William pointed consecutively to the cards, and the dog always barked when he came to the right one. Now, he did not consciously give the dog any sign, yet so quick was it in seizing the slightest indication that it was able to give the correct answer.

This observation is most interesting in connection with the so-called "thought-reading." No one, I suppose, will imagine that there was in this case any "thought-reading" in the sense in which this word is generally used. Evidently Kepler seized upon some slight indication unintentionally given by Sir William Huggins. The observation, however, shows the great difficulty of the subject, while it certainly seems to demonstrate a certain amount of psychic power.

If many are prone to exaggerate the intellectual powers of dogs, and horses, and elephants, others go to the opposite extreme. Descartes, we know, looked on animals as mere automata. Even recently Bethe, Uexkull, and other writers have denied the existence of any psychic powers, at any rate, in invertebrate animals, which they explain as reflex-machines.

I confess, indeed, that I cannot understand how any one who loves animals, or ever has devoted any study to them, can doubt that they possess some power of reason. Many of their actions are unconscious and instinctive; so are some of ours, as we may see by watching a child, but practice enables us to walk or run almost automatically.

Even as regards direction this may hold good. I have been for over fifty years a director of a company, which changed its offices twenty years ago, and I have not since had any occasion to enter our old house. One morning this summer, however, I was going to a committee in our present house, but thinking of other things I walked passed our door and two or three intervening houses and into the porch of our old office. In fact, many actions which cannot be called automatic are not necessarily conscious. They do not fall under the head of either instinct or reason.

Mr. Gladstone told me that once when he was forming one of his governments he had some difficulty in arranging the places. He and Mrs. Gladstone wrote down the titles of the offices and the names of the Liberal leaders on pieces of paper, and tried all the evening, but in vain, to fit them together.

At last they gave it up and went to bed. When Mr. Gladstone awoke in the morning everything was satisfactorily arranged in his head; his brain had worked it out for him in his sleep. This was not conscious reason, and certainly was not instinctive. Dr. Carpenter gave to such action the name of unconscious cerebration.

When birds build nests and bees cells, when they search for food, for warmth, and whenever they perform other similar actions necessary to life, we may, to some extent at any rate, find plausible explanations. No one attributes anything approaching reason, or even sensation, to plants.

The social habits of ants, however, afford other arguments which seem conclusive. Take first their relations with other insects. Those between ants and aphides, which have been called ant-cows, are indeed most remarkable. It is not merely that the ants milk them, defend them from attack, sometimes protect them by earthen enclosures from too great summer heat, but over and above all this they collect the eggs in autumn, keep them through the winter, and plant them out on their proper plant in the spring. Some of the root aphides may always be found in ants' nests, but I was much puzzled years ago by finding in ants' nests some black eggs, which obviously were not those of ants. Eventually I ascertained that they belonged to a species of aphid which lives on the leaves and leaf-stalks of plants.

These eggs are laid early in October on the food-plant of the insect. They are of no direct use to the ants, yet they are not left where they are laid, exposed to the severity of the weather and to innumerable dangers, but are brought into their nests by the ants, and tended by them with the utmost care through the long winter months until the following March, when the young ones are brought out and again placed on the young shoots of the daisy. This seems to be a most remarkable case of prudence. Our ants may not, perhaps, lay up food for the winter, but they do more, for they keep during six months, the eggs which will enable them to procure food during the following summer, a case of prudence unexampled in the animal kingdom.

Dr. Forel refers to the phenomena of memory as very conclusive. That insects remember cannot be doubted, for, as he observes:

"The slave-making ants (*Polyergus*) undertake predatory expeditions, led by a few workers, who for days and weeks previously have been searching the neighborhood for nests of *Formica fusca*. The ants often lose their way, remain standing, and hunt about for a long time till one or the other finds the topo-chemical trail, and indicates to the others the direction to be followed by rapidly pushing ahead. Then the pupæ of the *Formica fusca* nest, which they have found, are brought up from the depths of the galleries, appropriated and dragged home, often a distance of forty meters or more. If the plundered nest still contains pupæ, the robbers return on the same or following days, and carry off the remainder; but if there are no pupæ left they do not return. How do the *Polyergus* know whether there are pupæ remaining? It can be demonstrated that smell could not attract them from such a distance, and this is even less possible for sight or any other sense. Memory alone—i. e., the recollection that many pupæ still remain behind in the plundered nest—can induce them to return. I have carefully followed a great number of these predatory expeditions."

Again, ants are influenced by circumstances which can only affect mind. Dr. Forel says:

"While success visibly heightens both the audacity and tenacity of the ant-will, it is possible to observe, after repeated failure or in consequence of the sudden and unexpected attacks of powerful enemies, a form of ambulatory dejection, which may lead to the neglect of the most important instincts, to cowardly flight, to the devouring or casting away of offspring, to neglect of work, and similar conditions. There is a chronically cumulative discouragement in degenerate ant-colonies, and an acute discouragement when a combat is lost. In the latter case one may see troops of large, powerful ants fleeing before a single enemy, without even attempting to defend themselves, whereas the latter a few moments previously would have been killed by a few bites from the fleeing individuals."

Mr. Grote, the historian, in his *Fragments on Ethical Subjects*, regards it as an evident necessity that no society can exist without the sentiment of morality. He says:

"Every one who has either spoken or written on the subject has agreed in considering this sentiment as absolutely indispensable to the very existence of society. Without the diffusion of a certain measure of this feeling throughout all the members of the social union, the caprices, the desires, and the passions of each separate individual would render the maintenance of any established communion impossible. Positive morality, under some form or other, has existed in every society of which the world has ever had experience."

If this be so, the question naturally arises whether ants also are moral and accountable beings. They have their desires, their passions, even their caprices. The young are absolutely helpless. Their communities are sometimes so numerous that, perhaps, London and Peking are almost the only human cities which can compare with them. Moreover, their nests are no mere collection of independent individuals, nor even temporary associations, like the flocks of migratory birds, but organized communities, laboring with the utmost harmony for the common good. The remarkable analogies which, in so many ways, they present to our human societies render them peculiarly interesting to us, and one cannot but long to know more of their character, how the world appears to them, and to what extent they are conscious and reasonable beings.

I have not, at any rate, nor, indeed, has any one else, ever seen a quarrel between any two ants of the same nest. All is harmony. If, indeed, they are compulsorily made drunk, then, no doubt, they begin to quarrel. But no ant would voluntarily so degrade himself. Among the so-called higher animals which live in association, if one is old or ailing, it is often attacked. This never the case among ants. Instances of active assistance are, indeed, common. I have often witnessed cases of care and tenderness on their part.

In one of my nests was an ant which had come into the world without antennae. Never having previously met with such a case, I watched her with great interest, but she never appeared to leave the nest. At length, one day, I found her wandering about in an aimless sort of manner, apparently not knowing her way at all. After a while she fell in with some ants of another species, who directly attacked her. I at once set myself to separate them, but, whether owing to the wounds she had received from her enemies, or to my rough though well-meant handling, or both, she was evidently much wounded, and lay helplessly on the ground. After some time another ant from the same nest came by. She examined the poor sufferer carefully,

then picked her up and carried her away into the nest. It would have been difficult for any one who had witnessed the scene to have denied to this ant the possession of humane feelings. In face of such facts as these, it is impossible to regard ants as mere exquisite automatons. When we see an ant-hill, tenanted by thousands of industrious inhabitants, excavating chambers, forming tunnels, making roads, guarding their home, gathering food, feeding the young, tending their domestic animals—each one fulfilling its duties industriously and without confusion—it is difficult altogether to deny them the gift of reason; and the preceding observations tend to confirm the opinion that their mental powers differ from those of men not so much in kind as in degree.

This is also Dr. Forel's view. He says:

"It results from the unanimous observations of all the connoisseurs that sensation, perception, and association, inference, memory, and habit follow in the social insects, on the whole, the same fundamental laws as in the vertebrates and ourselves."

NOTES.

It is strange how Muriel Strode's *My Little Book of Prayer* is received with sympathy in the most diverse quarters of both orthodox Christians and liberal thinkers. As a companion letter to the opinion of a clergyman we publish the following extract from a letter of Mr. Thaddeus Burr Wakeman, President of the Liberal University in Oregon, and at Kansas City, Mo., formerly editor of *The Torch of Reason*, and a well-known contributor to to many liberal reviews. He writes:

"Lately there came to me a little book, *My Little Book of Prayer*, by Muriel Strode, published by The Open Court Publishing Co. It proved to be singularly suited to the state of mind which has followed from my retirement here during the illness of my beloved wife, and the affliction and grief which resulted from her death on the seventeenth day of November last. I love it because it is not 'prayer' in the old selfish, vulgar sense, but a noble dialogue between the transitory and the permanent in the human soul, and leaves the latter supreme as in the concluding lines of *Faust*. I like to think that it came from your hands, and because of some interest you still retain in me and my health, hopes, and work. I wish to assure you that you have my hearty thanks therefor. I think that some of my friends would also be pleased to see what has been so pleasing to me, and so for the enclosed please to let your clerk send me as many copies as it will cover, and at this address.

"Let us not forget these words:

"When I pray it should be to the God within, and the responsibility of the fulfilment shall rest on me."

"I am the Suppliant,—and I am the God that answers prayer."

"Let me live this life with no thought of a hereafter, *then* I may live it as I would were there no hope to retrieve."

"Not that I may more rejoice to live, but that with impunity I may also rejoice to die."

"And if the plan be not for immortality, O I shall not complain. *What* had it not been mine, this too brief span of years? *What* had I missed this sweet mortality?"