

**ANTS AND SOME OTHER INSECTS: AN
INQUIRY INTO THE PSYCHIC POWERS
OF THESE ANIMALS, WITH AN
APPENDIX ON THE PECULIARITIES OF
THEIR OLFACTORY SENSE**

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AUGUST FOREL

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Ants and Some Other Insects

An Inquiry into

The Psychic Powers of these Animals

With an Appendix on

The Peculiarities of Their Olfactory Sense

By

Dr. August Forel

Late Professor of Psychiatry at the University of Zurich

Translated from the German

By

Prof. William Morton Wheeler

American Museum of Natural History, New York

Chicago

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ANTS AND SOME OTHER INSECTS.

WHEN discussing the ant-mind, we must consider that these small animals, on the one hand, differ very widely from ourselves in organisation, but on the other hand, have come, through so-called convergence, to possess in the form of a social commonwealth a peculiar relationship to us. My subject, however, requires the discussion of so many complicated questions that I am compelled to assume acquaintance with the work of others, especially the elements of psychology, and in addition the works of P. Huber, Wasmann, von Buttel-Reepen, Darwin, Romanes, Lubbock, my *Fourmis de la Suisse*, and many others. Since the functions of the sense-organs constitute the basis of comparative psychology, I must also refer to a series of articles entitled "Sensations des Insectes" which I have recently published (1900-1901) in the *Rivista de Biologia Generale*, edited by Dr. P. Celesia. In these papers I have defined my position with respect to various authors, especially Plateau and Bethe.

Very recently Bethe, Uexkull, and others have denied the existence of psychic powers in invertebrate animals. They explain the latter as reflex-machines, and take their stand on the ground of the so-called psycho-physical parallelism for the purpose of demonstrating our inability to recognise mental qualities in these animals. They believe, however, that they can prove the mechanical regularity of behavior, but assume unknown forces whenever they are left in the lurch in their explanations. They regard the mind as first making its appearance in the vertebrates, whereas the old Cartesians regarded all animals, in contradistinction to man, as mindless (unconscious) machines.

The Jesuit father E. Wasmann and von Buttel-Reepen are willing, on the other hand, to accept the inductive inference from analogy as a valid scientific method. Like Lubbock, the lecturer and others, they advocate a comparative psychology of the invertebrates and convincingly demonstrate the existence of psychic faculties in these animals. Wasmann, however, puts a very low estimate on the mental powers of the higher vertebrates and, in my opinion, improperly, denies to them any ability of drawing inferences from experience when in the presence of new conditions (this alone he designates as intelligence); he believes that man alone possesses an immortal soul (independent of natural laws?) in addition to the animal mind.

It is necessary, first of all, to arrive at some common understanding concerning the obscure notion "psychic" in order that we may avoid logomachy, and carrying on theology in the sense of Goethe's Mephistopheles. Two concepts are confounded in an obscure manner in the word "psychic": first, the abstract concept of introspection, or subjectivism, i. e., observation from within, which every person knows only, and can know only, in and by himself. For this let us reserve the term "consciousness." Second, the "activity" of the mind or that which determines the contents of the field of consciousness. This has been included without further ado with consciousness in the wider sense, and thence has arisen the confusion of regarding consciousness as an attribute of the mind. In another place I have designated the molecular wave of activity of the neural elements as "neurocyme."

We cannot speak of the consciousness of human beings other than ourselves without drawing an inference from analogy; quite as little ought we to speak of a consciousness of forgotten things. The field of our consciousness is constantly changing. Things appear in it and disappear from it. Memory, through association, enables us to recall, more or less directly and with more or less difficulty, things which appear to be momentarily absent from consciousness. Moreover, both the experience of self-observation and the phenomena of hypnotism teach us experimentally that many things of which we seem to be unconscious, are nevertheless pres-

ent in consciousness or have been. Indeed, certain sense-impressions remain, at the moment of their occurrence, unconscious so far as our ordinary consciousness or superconsciousness is concerned, although they can be subsequently recalled into consciousness by suggestion. Whole chains of brain-activities, (dreams, somnambulism, or secondary consciousness) seem ordinarily to be excluded from the superconsciousness, but may subsequently be associated by suggestion with the remembered contents of consciousness. In all these cases, therefore, what seems to be unconscious is after all proved to be conscious. The above-mentioned phenomena have frequently led to mystical interpretations, but they are explainable on a very simple assumption. Let us assume—and this is quite in harmony with observation—that the fields of the introspectively conscious brain-activities are limited by so-called association or dissociation processes, i. e., that we are unable actively to bring them all into connection at the same time, and that therefore all that seems to us unconscious has also in reality a consciousness, in other words, a subjective reflex, then the following results: Our ordinary waking consciousness or superconsciousness is merely an inner subjective reflex of those activities of attention which are most intimately connected with one another, i. e., of the more intensively concentrated maxima of our cerebral activities during waking. There exist, however, other consciousnesses, partly forgotten, partly only loosely or indirectly connected with the contents of the superconsciousness, in contradistinction to which these may be designated as subconsciousness. They correspond to other less concentrated or otherwise associated cerebral activities. We are bound to assume the existence of still more remotely interconnected subconsciousnesses for the infra-cortical (lower) brain-centers, and so on.

It is easy to establish the fact that the maximum of our psychic activity, namely, attention, passes every moment from one perception or thought to another. These objects of attention, as visual or auditory images, will-impulses, feelings or abstract thoughts, come into play—and of this there is no doubt—in different brain-regions or neuron-complexes. We can therefore compare attention

to a functional *macula lutea* wandering in the brain, or with a wandering maximal intensity of neurocymic activity. But it is quite as satisfactorily established that other psychic phenomena external to attention are likewise present in consciousness, though in a feebler condition. Finally, it is well known that all that has been in consciousness—even that which is now more, now less, forgotten—is included in the psychic, i. e., in the contents of consciousness. On superficial consideration this appears to satisfy theoretical requirements. But in fact and in truth there are innumerable processes of which we are feebly conscious for only a scarcely appreciable instant and which anon disappear from consciousness. Here and not in the strong and repeated “psychomes”—I beg your indulgence for this word, with which I would for the sake of brevity designate each and every psychic unit—are we to seek the transition from the conscious to the apparently unconscious. Even in this case, however, the feeble condition of consciousness is only apparent, because the inner reflex of these processes can merely echo faintly in the field of a strongly diverted attention. This, therefore, in no wise proves that such half-conscious processes are in and for themselves so feebly represented in consciousness, since a flash of attention is sufficient subsequently to give them definite shape in consciousness. Only in consequence of the diversion of the attention do they lose more and more their connection with the chain of intensity-maxima which, under ordinary circumstances, constitute the remembered contents of our superconsciousness. The more feebly, however, they are bound to the latter, with the more difficulty are such half-conscious processes later associated anew through memory with the dominant chain. Of such a nature are all dreams, all the subordinate circumstances of our lives, all automatized habits, all instincts. But if there exists between the clearly conscious and the unconscious, a half-conscious brain-life, whose consciousness appears to us so feeble merely on account of the deviation of our ordinary train of memories, this is an unequivocal indication that a step further on the remaining connection would be completely severed, so that we should no longer have the right to say that the brain-activities thus fading away nebulously

from our superconsciousness do not have consciousness in and for themselves. For the sake of brevity and simplicity we will ascribe subconsciousness to these so-called unconscious brain-processes.

If this assumption is correct—and all things point in this direction—we are not further concerned with consciousness. It does not at all exist as such, but only through the brain-activity of which it is the inner reflex. With the disappearance of this activity, consciousness disappears. When the one is complicated, the other, too, is complicated. When the one is simple, the other is correspondingly simple. If the brain-activity be dissociated, consciousness also becomes dissociated. Consciousness is only an abstract concept, which loses all its substance with the falling away of "conscious" brain-activity. The brain-activity reflected in the mirror of consciousness appears therein subjectively as a summary synthesis, and the synthetical summation grows with the higher complications and abstractions acquired through habit and practice, so that details previously conscious (e. g., those involved in the act of reading) later become subconscious, and the whole takes on the semblance of a psychical unit.

Psychology, therefore, cannot restrict itself merely to a study of the phenomena of our superconsciousness by means of introspection, for the science would be impossible under such circumstances. Everybody would have only his own subjective psychology, after the manner of the old scholastic spiritualists, and would therefore be compelled to doubt the very existence of the external world and his fellow-men. Inference from analogy, scientific induction, the comparison of the experiences of our five senses, prove to us the existence of the outer world, our fellow-men and the psychology of the latter. They also prove to us that there is such a thing as comparative psychology, a psychology of animals. Finally our own psychology, without reference to our brain-activity, is an incomprehensible patchwork full of contradictions, a patchwork which above all things seems to contradict the law of the conservation of energy.

It follows, furthermore, from these really very simple reflections that a psychology that would ignore brain-activity, is a monstrous