

AN EXPERIMENTAL STUDY OF SLEEP

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CHAPTER IX

Experiments on Dogs

AS we come nearer to the higher animals we find it easier to interpret the phenomena under observation and experimentation. The subwaking states become more defined and sleep is fully recognized at the first moment of its oncome. Thus in dogs we can more easily interpret the different motor activities in relation to their subjective correlatives and accompaniments. Man can so closely put himself into the subjective mood of the dog he knows that he can understand apparently the slightest expression of the animal's wishes and emotions. The artificial selection of the most intelligent and most devoted dogs as well as the constant companionship with the human race could not but affect the canine races and bring the most manifold expression of their emotions, wishes, and desires within the scope of human interpretation. Dogs have the mental touch of man and are described by the poet as dreaming in their sleep:

“Consueta domi catulorum blanda propago
Degere, saepe levem ex oculis volucremque soporem
Discutere, et corpus de terra corripere instant,
Proinde quasi ignotas facies atque ora tuantur.”

Lucretius describes vividly the active dreams of the hound hunting in his sleep:

“Venatumque cams in molli saepe quiete
Jactant crura tamen sudito, vocesque repente
Mittunt, et crebras reducunt naribus auras,
Ut vestigia si teneant inventa ferarum:
Experge factique sequuntur mania saepe
Cervorum simulacra, fugae quasi dedita cernant;
Donec discussis redeant erroribus ad se.”

Dogs have some imagination, even if they are not poets, and cannot retort man in kind. Dogs, standing higher in the scale of development, lend themselves far better than the rest of lower animals for the study of sleep. As adult dogs are rather difficult to manage for sleep experiments, because of the excitement in which they are thrown and because of their excitement in which they are thrown and because of their resistance to being handled by men other than their masters, I selected for my experiments young dogs, especially puppies. I did the same thing in the case of cats for the same reason, as grown-up cats are still more unmanageable than dogs. It is true, as Huebel has pointed out, that if the master of the dog should try his hand, he would no doubt succeed in putting the dog to sleep. Puppies are very docile, they get easily adapted to a new person and do not manifest the individual liking of their master and the abhorrence of strangers as grown-up dogs do. I have no doubt that if a grown-up dog should be put by his master under the conditions of *monotony, limitation and inhibition*, the success would almost be certain in each and every case. In fact, I tried the experiment on an older dog of mine with great success every time I put the dog under the requisite conditions conducive to the oncome of subwaking states and sleep. I shall give an account of these experiments in this research. I find that dogs, like men, easily fall into subwaking states and sleep.

There is also another reason why I chose puppies for my experiments. Puppies, especially very young ones, sleep a good deal and not having the nervous activity and distractions of older

dogs are more amenable to the conditions of subwaking states and sleep. In carrying out experimental work it is best to select the material and put it under the most favorable conditions.

We may pass now to the experiments proper. I quote from my notes those experiments which are typical of the rest.

Two puppies of about two months old; very lively, excitable, and barking violently. After some struggle each one was wrapped in a cloth so that even the forepaws did not protrude. At first they were greatly excited by the proceeding and proclaimed their indignation by loud yelping. I took my turn with each one separately. The puppy was held down firmly and given no chance to move its body or to struggle with its paws. I also closed the puppy's eyes with my fingers. The puppy struggled and wriggled under my hand, but I held on tightly. Gradually the puppy ceased its struggles and became very quiet. Respirations became slow and regular. I gradually released my grip on the dog, when I found that its eyes were firmly closed. The puppy he was fast asleep. The same performance was carried out in the case of the other puppy. After five minutes, during which time I held the dog tightly and kept all the extremities in close grip, the puppy passed into a quiet state and fell asleep as the first one did. Respiration was slow and uniform. Both puppies slept peacefully. There was no response to external stimuli. Limbs were in a state of relaxation. In spite of the noise in the neighboring room the puppies kept on sleeping. After twenty minutes one of the puppies woke up, made some show of struggle, but the eyes remained shut and he fell asleep again. I tried to loosen the cloth in which the puppies lay enwrapped. My manipulations did not disturb their sleep. The puppies kept on sleeping the sleep of the just. After a sleep of about an hour I had to disturb the repose of the little ones and wake them up, as I had to leave the laboratory, otherwise they might have slept much longer.

The cloth was now uniformly adopted by me in my experiments for the control of the voluntary movements. Unless the little ones were wrapped in the cloth there was great difficulty to restrict their activity. The puppies fought like furies. One of them was specially unmanageable. A few shakings quieted him. The puppy was wrapped in a cloth and after a few minutes went into a deep sleep. It withdrew the paws on irritation or on pinching, but the eyes remained firmly shut. Respiration and pulse were slow.

The puppies were put to sleep under the same conditions. This time they could not sleep soundly, on account of the continuous noise in the next room. They woke up every time, but fell asleep again. They growled in their sleep, evidently reacting to the external noises, but they did not wake up. One of the puppies turned on one side, apparently to make himself more comfortable and kept on they. They were, however, today more restless than they were on former occasions. Maybe hunger gnawed at their entrails, maybe it was the noise of the school that the puppies could not stand. After about a quarter of an hour they woke up and looked like two little surly pups gathered them once more up into the folds of my cloth, and gently, but firmly, forced them to sleep again. They were to sleep much more easily with no fighting. When passing into sleep, I tested the forepaws of each of the puppies. As this time the forepaws were quite free, I could observe well their position, change them, and manipulate them. first the limbs showed some resistance to change of retained position impressed on them, a slight cataleptic state. Then the limbs relaxed and remained in this condition till the end of the experiment. This time the noise in the adjoining room ceased and the youngsters seemed no longer disturbed. I let them sleep for about three quarters of an hour, when I began to tickle them, pinch them slightly, and change the position of the paws. They began to move restlessly and gradually got out of sleep. The eyes opened

lazily, and they evidently felt ready to go to sleep again. Before waking up fully there was a slight state of resistance in their forepaws, catalepsy seemed to return again. This slight catalepsy in regard to retained postures and to changes of the position of the extremities lasted a few seconds and disappeared. Thus in getting out of sleep the puppies passed once more through some subwaking state with its accompanying catalepsy.

The puppies were put to sleep again. The conditions; of monotony and limitation were the same as before. Forepaws were free, protruding from the cloth. When the puppies sank into sleep, the paws were slightly resistive. The least disturbance brought the puppies out of the passive state. Typical manifestations of subwaking, hypnoidal state were present. Respiration gradually fell, the passive state became intensified, and the puppies fell into a sound sleep. The paws became fully relaxed. The eyelids were firmly shut and at first resisted pulling apart. When the eyelids were separated, the eyeballs were found rolled up; pupils were in state of contraction. When I let go the eyelids, they closed again and remained firmly shut. There was almost no response to external sensory stimulations. The puppies slept half an hour, when I began to waken them slowly, again before full waking a slight catalepsy was observed in the limbs, the puppies passed through the intermediary, hypnoidal state. They looked sleepy when they opened their eyes and kept closing them. They stretched their little paws as after a good sleep and yawned.

One of the puppies was very irritable and surly; it fought like a little fury. It squealed, barked and yelped. After a little jostle in the cloth it fell asleep peacefully. Again a slight catalepsy of the limbs was observed for a brief period of a few seconds, then relaxation set in. The puppy slept very soundly; it did not react to stimuli of medium intensity. Reflexes of forepaws were present and when the stimuli became summated the paws changed

position, the body, then also tended to change its posture. The eyelids were firmly closed; when opened by force, the eyeballs were found rolled up and the pupils contracted.

The other little puppy was more amenable to treatment,—it did not resist, but seemed to be resigned to its fate. When wrapped in the cloth, it was very good natured. When I put my fingers on its eyelids and had them firmly shut, the puppy remained in the same position without fighting. Respiration was quiet, uniform, lowered. As the puppy sank into sleep the paws were found slightly resistive to bending; they were extended, but soon became relaxed and remained so throughout the sleep state. The puppy slept quite peacefully. Reflexes of forepaws were present. It did not react to slight stimulations, such as tickling or pinching of the skin, or even to pricking of the forepaws. It did not react by shifting the body or by waking up and opening the eyes, it only moved the forepaw that had been stimulated. The eyelids were firmly shut and resisted opening. When opened by force, the eyeballs were found rolled up, so that the whites or the sclera could be well seen partly covered by nictitating membrane. The dog was awakened by summation of slight stimulations.

Three new puppies were very tractable. They fell asleep with the greatest ease imaginable. The puppies were about two and a half weeks old, were quite gentle and showed almost no resistance. The same phenomena were present as in the other dogs; they went to sleep under the same conditions, their paws for a brief period of a few seconds were extended and slightly resistive. Limbs retain the position given to them. The eyelids were firmly shut and there was resistance to attempts to force them open. When forced open, the eyeballs were rolled up, and the eyelids closed as soon as they were let go. The puppies seemed to possess the power of sleeping indefinitely. Now and then sucking and snapping movements were observed. They slept

for more than an hour and would have gone on sleeping had not they been rudely shaken out of their peaceful repose.

The experiments were repeated over again with the same results. As the puppies got older the manifestations of the transient, intermediate state became more pronounced,—catalepsy was more evident on falling asleep. The same held true in the case of waking up. There was a slight stiffness and catalepsy of the paws for a brief period when the puppy emerged from sleep. On falling asleep the puppies did not tumble at once into that state, they opened and shut their eyes, when my fingers were released from pressing their eyelids. They kept on blinking the eyes. The lids came nearer together and finally closed. The same process of blinking was observed on waking; the seemed to wake and fall asleep again, thus being really in the intermediary, hypnoidal state, hovering between waking state and sleep, both on going to and coming out of sleep.

With the repetition of the experiments the little fellow learned to go to sleep with greater and greater ease, manifesting, as time went on, more and more clearly the characteristic symptoms of subwaking and sleep states. After a time there was no need to keep their eyelids closed with my fingers; it was enough to shade their eyes with my hand or with any opaque body and the eyes after a few seconds, began gradually to close. A slight tremor of the eyelids was observed as they kept on opening and closing, somewhat similar to what we find in the first stages of hypnosis. Only here it was not really hypnosis, but the hypnoidal state, partaking of hypnosis, waking state and sleep. The puppies did not really go into any hypnosis, but into something bordering closely on the hypnotic state. Instead of going into the hypnotic state, however, as the fully developed human subject would occasionally do, the puppies went into sleep.

What interested me most in the puppies was the fact of their habituation to the sleep-procedures. They seemed to like the whole procedure and had no objection to my manipulations, so that after a time I even ventured to put them to sleep on the table without wrapping the cloth round their limbs; the little fellows went to sleep as cheerfully and as soundly as before. They lost all fear and lent themselves readily to the operations. It was thus sufficient for me just to put them down on their sides, and it did not matter on which (they would not sleep on their backs), when the puppies, of their own account, almost, went into their customary subwaking and sleep-states.

Those puppies were gone and another puppy, an untrained one of the same litter, had taken their place. This little fellow was about a couple of months old and was a hard nut to crack. He was sturdy, fat and refractory. I had quite a tussle with him. It took me more than half an hour to appease him. He became quiet for a few minutes and seemed to have gone off into a passive condition closely bordering on sleep, but he was soon up and in arms again. Maybe the loud knocking in the adjoining room disturbed the experiments.

I wrapped him all round in the cloth and shutting his eyes firmly with my fingers and holding him down tightly with my hands, I finally succeeded in moderating his ardent temper. The loud barking gradually subsided, and finally degenerated into growling. This growling really added to the monotony of the sensations. The growling then diminished and the little fellow began to breathe more quietly, the heart-beat due to excitement subsided, and the puppy fell asleep. He slept quietly for about ten minutes only and woke up again. His eyes looked sleepy and he yawned for some time.

An attempt was made to put him to sleep under the same conditions of monotony and limitation, but it was difficult to quiet

him. He barked and struggled and refused to let himself be controlled. It was decided to let him go for that day. This condition kept on for several days. The most that could be done with him was to wrap him in the cloth, hold him firmly with the hands, and have his mouth shut.

I confess that at first I almost despaired of ever breaking the youngster into the game. I kept at him, however, and after a long series of trials the little fellow did not meet me any longer with such feelings of opposition. Finally, one day after a hard tussle and a few severe shakings I decided to leave him to himself. To my great surprise the puppy became quiet, his eyes became perceptibly narrower, and at last he fell asleep. The sleep was very sound. He did not open his eyes when I changed the position of his paws, nor did he even open his eyes when I tickled the paws or pricked them. The only response to those stimulations was the reflex movement of the paws, drawing them, away from the direction of the stimulus. The eyes were firmly shut, and when I attempted to separate the eyelids, the latter resisted quite perceptibly my efforts. When I did open the eyelids, the eyeballs rolled up and the pupil was contracted. The puppy slept for about half an hour. I decided to awaken him and see what he would do and also to observe the stages which he would pass in getting out of the sleep-state. The cloth was unrolled. This awakened him. He opened his eyelids, stretched his forepaws and was going to sleep again; the eyes closed. On testing his forepaws, there was some resistance, though very slight, but it could be noticed on attempting to bend the paw at the joint. The eyes opened and closed; finally they opened fully and the little fellow stretched out his paws and yawned with a good relish as after a delightful sleep. At last then my long efforts were crowned with success. The puppy did fall asleep and in waking was observed to pass through the characteristic stages of hypnoidal states.

The advantageous moment was then seized to push the matter for all it was worth, to again induce sleep under the conditions of monotony and limitation now that the puppy proved so obliging and went off into sleep on its own account. The cloth was wrapped round the puppy's limbs holding him down firmly. I closed his eyes with my fingers; the puppy, having been just awakened from his deep sleep, felt more gracious and did not kick much, opposed but little and in a few minutes fell into a deep sleep. After sleeping for about a quarter of an hour he was awakened. On awakening for a brief period the presence of the intermediary, subwaking, hypnoidal state was observed. I immediately proceeded to put him to sleep again, giving him no respite and plunging him rapidly in succession from waking into sleep and then again from sleep into waking states. This process was kept up a few times until it was quite certain that the little fellow was under control. The puppy got thus habituated to manipulations as well as to the rapid transitions from waking to sleeping and back again. Every time he was brought out of sleep the puppy was very quiet and did not resist my efforts to put him to sleep again. At first I did not dare to observe closely and especially to experiment on the first stages of going into sleep, lest I might disturb the puppy and thus break the charm, as I was anxious that he should first of all be habituated to the process and to the sleep-states under the conditions of monotony and limitation and should cease to show resistance. After a number of experiments the puppy became tractable and thenceforth the experiments could be carried on without any further protests and rows on his part.

From now on the experiments proceeded in peace. When occasionally the little fellow became obstreperous, a few shakings brought him to his senses.

After wrapping the puppy in the cloth, and holding him

firmly with both hands, I closed his eyes with my fingers. After a few seconds the puppy fell asleep. The eyelids were firmly closed. When an attempt was made to open them, they resisted; when the eyelids were separated forcibly, the eyeballs were found rolled up. There was contraction of the pupils and when darkened with the palm of my hand, the reaction was very sluggish. When the conjunctiva was touched with my fingers, there was a slight reaction of closing the eyelids and slight shifting of head and body, but the puppy remained asleep. He slept for about half an hour and was awakened for further experimentation. On awakening, the puppy passed as us through the transient subwaking state characterized slight catalepsy of the extremities.

The puppy was put to sleep again with the cloth about his extremities; the forepaws were more or less loosened for observation and experimentation. The head was left protruded out of the cloth so as to observe the change. This condition was always observed in my experiments sleep, only in some cases the head was kept a little cove so as to keep out the light. In this case I had the head fully uncovered. My fingers were kept on the puppy eyelids, but I removed them in a few seconds. The eyelids were found partly closed and I observed a peculiar tremor of the eyelids similar to that found in human subjects before falling into the hypnotic state. The eyes of the puppy were shaded with the palm of the hand. Gradually the eyelids closed tremulously. It could be distinctly seen how they opened partly, and then closed again. After the eyelids became fully shut, a peculiar phenomenon strikingly analogous to one manifested in hypnotic subjects, was observed; the puppy seemed to try to open the eyes but could not do it. He tried evidently quite hard to raise the eyelids, but only succeeded in raising a part of the lids, thus exposing a slit of the sclera; the eyeballs in this ineffectual effort of the puppy to open its eyes were seen be rolled up. The eyelids closed again. The efforts the part of the puppy to open its eyes were repeated a few

times and each time the attempts were in vain. The eyelids then closed and remained so. This is so striking and similar to what is observed in the hypnotic subjects that one is almost tempted to describe this condition as hypnosis. At any rate one is justified in saying that we observe here *a phenomenon which is strikingly analogous to the hypnoidal state*. In going, then, into the sleep-state the puppy pass through a state which is evidently on the borderland of sleep and what in the human subject is described as hypnoidal. This borderland state forming an intermediary state between waking on the one hand, hypnosis or sleep on the other, is just what characterizes the subwaking, hypnoidal state. There seemed little doubt that in going into sleep the puppy did pass through hypnoidal states.

Another fact that may be of interest in the sleep of this Puppy, as well as of the other puppies under observation, was the shivering in going to sleep. The extremities trembled when raised and a transient state of resistance and catalepsy was often observed. This catalepsy was specially pronounced when the forepaw or any other of the extremities was extended and a little manipulated. It seems as if we give here a suggestion to the puppy, as is the case with the state of abnormal suggestibility in the human subject. I may add that these manifestations of the hypnoidal state were not so marked on awakening.

After control was gained over the puppy he could be handled safely. It was thought it might be well for the sake of the experiment to irritate the dog a little and see what would be the result. He was forcibly pressed and choked very slowly so as to avoid the sudden onset of excitement. He yelped, but it seemed that the habit of going to sleep was even stronger than the excitement. In spite of all the irritation the puppy soon became quiet and when his hind limbs were wrapped around, he soon was disposed to fall asleep. With my fingers I just covered his eyelids,

but did not press on them. It was just the merest suggestion of pressure on the eyes, but the little fellow went into a sound sleep. Before falling asleep I observed the usual blinking of the eyes, the opening and closing of the eyelids and twitching of the orbicularis palpebrarum as well as the rise and fall of the eyelids until the eye became completely closed. On attempting to open the eyelids there was great difficulty in separating them. On examination the eyeball was found to be rolled up, the pupil contracted and not reacting to light. The conjunctiva was found almost insensitive. The dog responded to stimulations by reflexes of the forelimbs and on stronger stimulations by movements also of the hind limbs, but he did not wake up. At first the limbs were slightly resistive, especially when I manipulated them, pressing and kneading the muscles of the upper front leg. The cataleptic state of the extremities was, as usual, only transient and the limbs remained during the whole state of sleep in a condition of relaxation. The same state, though slighter, was as usually, also present when the dog was aroused from his sleep by a summation of stimuli.

The sleep experiments were carried out on this formerly refractory puppy with great ease. In fact, the facility with which sleep was induced far exceeded the experiments performed on any of the animals handled before. It could only be compared to the ease with which a subject on repetition of hypnotization goes into hypnosis. Still it is not possible to regard the sleep of the puppy as hypnosis. There is no suggestibility present, nor that characteristic *psychophysiological plasticity of associations and dissociations during or after hypnosis*. The state in which the puppy falls is nothing else than normal sleep. Only in passing into that condition *there are present manifestations which recall the hypnotic state*. The reason is very simple, the puppy is passing through a state which is intermediary in character between waking state and sleep. This intermediary state is hypnoidal in nature and has some manifestations which are analogous to hypnosis in the

higher and more developed mental states of man. In the dog we have the foreshadowing of what is afterwards fully found in man alone. *The hypnoidal state precedes and succeeds sleep.*

As I continued my sleep experiments on the puppy, it became easier and easier to put the little one to sleep; so much so that after a time I could put the puppy into sleep, first passing through all the stages observed, though the cloth, that magic for the induction of sleep, was no longer used. I put the puppy on the table, just kept him quiet by patting him a little, and pretty soon off the little fellow went into the land of Nod.

The puppy was put on the table, then laid down on his side—he did not resist, he kept as quiet as a little lamb. His eyes were shaded with a screen and the little fellow marched off into sleep. To produce sleep in the puppy after a few weeks' training was just child's play. The contrast to his previous unmanageable condition was great indeed. It was now possible with the greatest ease to have him pass from sleep to waking and from waking to sleep. The contrast here was also very surprising, the puppy played, ran around barked violently and in a few moments he was fast asleep with limbs relaxed and immovable, with eyes firmly closed, eyeballs rolled up, pupils contracted, conjunctiva anaesthetic, and all the sense-organs dulled and stupefied, as if by a hypnotic or anaesthetic. In a few moments more the puppy was up again, gave a yawn or two and was as restless and playful as ever. The transition from one state into the other was so rapid that it was almost marvellous.

The puppy was found very restless, barking and jumping, but as soon as he was put on the table, his limbs were kept quiet for a few moments, his eyes shaded; his eyelids began to blink and the muscles around the eyes to twitch, and the fellow began to shiver, not from fear, as the heart-beat was not accelerated, but slower, and the respiration was tranquil and lowered. The

shivering was one of the phenomena observed in puppies, when on their way into sleep. What was specially interesting, in the series of sleep-experiments was not only the significant fact that the puppy under the conditions of monotony and limitations was going off into sleep without resistance and delay, but that before going to sleep, when the eyes were about to begin to blink, and the eye-muscles to twitch, *the little fellow raised his eyes to me and looked at me and then, as if satisfied that everything was all right, off he went into his sleep contentedly.* This state is often observed in the hypnotic subject.

It seemed to me worth while to test whether the personality of the experimenter had any influence. When putting the puppy to sleep, I called Dr. Cannon to see it to test the phenomena of the subwaking hypnoidal state. To my great surprise I found that I could not succeed with the puppy as well. There was some difficulty in putting him to sleep, although there was not really active resistance. It took me some time before I could put the puppy to sleep and then test for the hypnoidal state and show it to Dr. Cannon. *There seems then to be a true personality-element present in the experiments.*

I then left the puppy for about a week. I wanted to see whether it would make any difference in the ease of putting him into the sleeping condition. After more than a week, I found that he did not submit so cheerfully as before. It took me fully ten minutes to put him in a state of sleep. Finally he did go into a sleeping condition with all the symptoms characteristic of the subwaking and sleeping state. In about a quarter of an hour he woke up, but soon fell asleep again and slept for another half hour, after which he was awakened. He seemed sleepy and looked ready to go to sleep again, which he really did after I had kept his limbs and body quiet for a few seconds and the eyes shaded. Thus the habit was quickly re-established.

To bring the personality-coefficient, so to say, more to the foreground, I decided that the dog should be put to sleep under the same conditions of monotony and limitation, not by me, but by another person. I asked Mrs. S. to lend me a hand in the present experiments and see what she could do with the puppy in putting it to sleep. The puppy was kept quiet on the table without being put into the cloth as I had been lately conducting my experiments; but the result was not successful. Mrs. S. then resorted to the old conditions, namely to the cloth. The puppy went to sleep, but after some considerable trouble, though I must say he did not show any fight as I should have expected. It was then easy enough to put him to sleep without any cloth, though Mrs. S. could not accomplish it as easily as I could. *There is then present a personality-coefficient* in putting the puppy to sleep, but the coefficient is very slight in the puppy at least. *The conditions of hypnoidal states and sleep, namely monotony and limitation, are the most important.* For Mrs. S. could put the puppy to sleep; it was only a matter of time. Monotony, limitation and inhibition may thus be regarded as the conditions under which we can induce in the dog sub-waking hypnoidal states and sleep.

I may add that I also carried out similar experiments on a dog of six months old. As the dog was used to me I had no difficulty in inducing sleep. I made him keep quiet and then closed his eyes firmly. He went to sleep. When I tried to open his eyes, they resisted. When I opened them, I found the eyeballs rolled up, nictitating membrane over part of sclera, and pupils were contracted. There were present the same manifestations of hypnoidal states, the slight catalepsy on falling asleep and a similar, though somewhat slighter catalepsy on awakening. There was little difficulty in putting the dog to sleep. With the repetition of the experiments it was easier to put him into hypnoidal states and sleep under the conditions of monotony, limitations of voluntary movements and inhibition. The dog was very lively

otherwise, but when put under the conditions of monotony and limitation of voluntary activity, he sank into a passive state and then into a state of sleep.

We see, then, that dogs are subject to the same condition of sleep-states as is the case with the other animals experimented upon. In fact the experiments on dogs bring out the fact that the conditions requisite to induce hypnoidal states in men also hold good in the case of dogs. The hypnoidal states, both on falling into, as well as rising from sleep, are far more pronounced in the dog than in the lower animals experimented upon; the states themselves come up far more closely to similar states observed in men under the same conditions of monotony, limitations and inhibition than they do in lower animals, such as the frog, the guinea-pig or the cat.

Phylogenetically regarded the hypnoidal is the primitive “rest-state” out of which sleep and hypnosis have become differentiated. The lower the animal the more insecure, the more instable are its “rest-states,” The animal must be on the alert in its rest, and “sleep”, if at all, with its eyes open, so to say. It must be quick to wake and run from danger or if it cannot get away, it must “freeze and feign death”; in other words it must be able for the sake of protection to fall into a state of catalepsy. Hence the rest-states must partake of waking, sleep and hypnosis, that is, must be essentially hypnoidal in character. The experiments on dogs are more instructive than the ones carried out on the other animals, because they clearly bring out the general principle of monotony and limitation in the causation of sleep. *Diminution in the variability of the volume of sensory impressions brings about the state of sleep.*