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Duke University

THE PARAPSYCHOLOGY LABORATORY

July 10, 1953

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REPORT
ESPTHE COMMANDING OFFICER
Engineer Research & Development Laboratories
Fort Belvoir, VirginiaAttention: Mr. Leonard O. Goff
Mr. Wilbert W. Toole

Dear Sir:

This is the final report on the two branches of the experimental work carried out under the contract between your laboratory and Duke University, for which this Laboratory has assumed responsibility. Professor Markee will, in his report, show now only his own branch of the experimental work but the financial report for all three of the subdivisions. The two subdivisions with which this report deals may be designated as the mine-location branch and the project concerning extrasensory perception in dogs.

I. Abstract

The research project was begun with the question posed as to whether dogs could, as claimed, locate buried land mines under conditions that gave no normal sensory cues. It was necessary to devise reliable scientific methods for determining whether or not this claim was justified. A method was designed which, with modifications in progress and in trial, proved satisfactory for the purpose. Experiments were carried out on dogs that had, in the meantime, been especially trained for the purpose and significant evidence was produced that trained dogs could detect Schu mines to a highly significant and reliable degree when these were buried under moderately moist beach sand to a depth of a few inches and all surface traces removed. The next step under the assignment was to find out whether or not this was a sensory mode of perception or, more specifically, a wholly sensory response. This requirement called for new methods and the tests were then carried out essentially as before but with the mines buried under sand which was under water and the water moving under the influence of cross winds.

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Under these conditions the dogs, after special training to the new situation, gave a significantly better than chance location of the mines. There was a conspicuously greater uncertainty and a falling off of the rate of success as the experiment continued. After a time no success above chance was obtainable. At this point the next step indicated was one of trying new dogs, trying changes to recover the old ones for further use, and attempting to accelerate the collection of data beyond the slow pace maintained up to that point. From here on, however, the difficulties converged. A new site was obtained, other dogs trained, and the old dogs tried again. The old dogs were even returned months later, along with new ones, to the old site on which the earlier results were produced. All of these efforts resulted in mere chance results. The mines were not located under water except by accident. The earlier under-water work with the dogs rests on the independent observation of Dr. Luman Ney's tests with our dogs as well as my own. Each separate investigation stands by itself. Tests made on the adequacy of the moving-water screen preventing chemical stimulation from reaching the dogs from the buried objects showed that the motion of the water carried soluble material as well as colloidal substances well beyond the range of the pathway of the dogs before it reached the surface. There is at least no known way in which the dogs could have located the under-water mines in the earlier series except by extrasensory perception. Obviously, further experiments were indicated. There is a problem which remains unsolved.

The experimental work on extrasensory perception or ESP in animals with special reference to dogs led to a study of the capacity in cats which has yielded positive results in two lengthy series of experiments carried out under good conditions of control. The reason for the use of cats in this study was their easy availability and the comparative efficiency of working with these more easily handled animals. Much was learned from the cats that was of use in the experiments with dogs. Another species introduced into the research was the pigeon. The mystery of pigeon homing and the possibility that extrasensory perception enters into that performance led us to undertake the solution of the problem of how these pigeons find their way home. At the termination of the contract the problem had not been solved, but a sufficient advance had been made to put this Laboratory in the lead on that long unanswered question. As of the present, researches which this Laboratory has had a share in confirming have ruled out all existing sensory hypotheses, thereby making extrasensory perception a more plausible interpretation than it has been hitherto. The problem is still unsolved.

The special attack at the moment is on the development of a definite ESP test for pigeons, designed to utilize homing behavior. A third approach on the question of ESP in

animals has been carried out on dogs and has been aimed at the development of a satisfactory ESP test for that species. This has been an exploratory undertaking, naturally, in which the main profit has been experience. From this experience it would appear that at this stage there is promise of getting a satisfactory ESP test out of the retrieving behavior of the dog, and some, at least, of the favoring conditions and techniques have been developed out of the trial and error of a number of workers.

The view to which we have been led is that the dogs in the under-water mine location tests showed about the same order of extrasensory perception as that shown by the cats, in somewhat comparable tests of ESP, and that both species showed the same limited evidence of the capacity that has been found in human subjects. All showed a tendency to decline to chance performance in a continuation of the tests. In all situations the conditions of the test and the treatment given by the handler or experimenter were important factors. These findings might be considered indications in need of further confirmation rather than established conclusions.

II. Introduction

I will summarize first the work done on the project of mine location by dogs, leaving to a separate section of the report a summary of the work done on the general question of ESP in animals. These projects are treated separately because, in the judgment of your engineers with whom we have collaborated, there is not the close relationship between these different lines of the project that we ourselves have assumed.

When this Laboratory was first confronted with the problem of mine location by dogs the first question that had to be dealt with was that of whether the claims upon which the project was based were realiable. An investigation of the available reports and visits to England to learn what the British Army had found led to a serious question as to whether the claim was well founded that dogs could locate buried mines when there were no normal sensory cues available. In collaboration with the project engineers of your laboratory it was planned to attack this first question in collaboration with Stanford Research Institute. This Laboratory was assigned the phase of designing an adequate experimental test. This, with some modification in discussion with various members of your laboratory and S.R.I., was satisfactorily accomplished, although delay was introduced

by the difficulty of getting adequately trained dogs. This had been S.R.I.'s responsibility. Under a new arrangement both S.R.I. and this Laboratory independently undertook the training of dogs with the assistance of Joe Simpson, who was selected for the purpose with the aid and counsel of William Johns, who had had charge of the training of mine dogs for the U.S. Army. After a period of more than 3 months of training, two out of the six dogs were considered ready for the tests planned to determine whether or not the dogs could locate the mines. With this introduction I shall turn to a summary of the tests and results as already reported in earlier communications and go on to the more detailed account of the still unreported observations.

III. Experiments and Results on Mine-locating tests with Dogs

Tests were carried out on the beach of the Marshall Ranch on the coast of California in June, 1952, using two of Simpson's dogs, Tessie and Binnie. In some of these tests, especially those on the beach out of water, Mr. Goff and Mr. Toole were present. Mr. Toole continued on into the beginning of the tests with the mines under water. The method used had been developed at this Laboratory. The basic idea was to introduce into the test a clear idea of what chance alone would produce in the way of results. The aim was also to simplify the evaluation so that it would be possible right on the spot to know how well a given dog was doing in order to make the most of the short time necessarily available for testing. It was necessary to fit the test to the working habits of the dog and the trainer, and this was done in preliminary tests with Simpson. It is necessary, too, to eliminate sensory cues that might obviously indicate the location of the mines to the trainer or the dog. The first stage requires only that the dogs be tested as to their ability to locate mines when there are no obvious sensory cues given. With this in mind, the first tests were conducted with mines buried a few inches deep in moderately moist beach sand. A trench was prepared all the way along a stretch of a measured length, so that the earth would be uniformly disturbed. A given trial of the test procedure consisted of asking the trainer to get an alert from his dogs and one alert only for each ten-foot section. He was told that there was a mine located at the center of one of the five units and that the particular unit selected was determined by chance. For this a table of random numbers had been used. (Later we abandoned making the trench all the way along the segment and reduced the labor by making the same depth of excavation in the center of each unit of the segment.) The mines were laid with the trainer and dog well beyond the range of vision of what was going on at the beach level, although they were visible to the experimenter. The mines were placed, the trench filled uniformly, and the surface raked so as to remove footprints and other possible indicia. The trench line itself was, of course, not concealed. The dog, at first, was led directly over it. With the mines

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buried under two to three inches of moist sand that packed, it was reasonably unlikely although not certain that the dogs could not locate the mines by contact through their feet. However, the success was high enough that it was soon evident that the dogs were alerting the mines before they set foot on the surface above them. The dogs were led down wind over the trench area and wherever they alerted a marker was placed by the handler. If more than one marker was placed in a ten-foot segment, the dog was led over the area again until it gave enough indication to enable the handler to eliminate all but one marker. This simplified the evaluation of success. The results of the first day's total of fourteen trials, that is, fourteen segments, seven for each dog, was eighty-six per cent successful. Each dog missed one mine out of the series, not the same one. This result, along with the preliminary reports, was considered enough, in view of the shortness of time, to justify advancing to another stage of the investigation.

The next step in the investigation of the mine-location tests was carried out on the next three days at Marshall Beach, the twenty-third through the twenty-fifth. Since this turns out not to be of crucial importance, and since it was reported in full in my technical report of July 15, 1952, I shall here state only that it dealt with the possibility of using strong cross winds as at least a tentative control over chemical stimuli from the mines. Since our next problem, once it was established that the dogs could locate mines without surface cues, was to determine how they did it, and especially whether or not extrasensory modes of perception were involved, it was important to move ahead on the elimination of olfactory stimulation in the test as far as possible. The test referred to here that represented the first step in this direction had to do with working the dogs off the trench line to windward and to leeward to determine, if possible, whether good detection was possible when the cross winds were carrying all volatile substances away from the animal. While the dogs were successful in locating a sufficient number of mines during these three days of testing to assure us that the results were not due to chance, it was manifest after that much testing that that method of control could not be very indicative. In any case, it was intermediary to the under-water test which had been in prospect from the beginning, having been suggested by William Johns. During these days of cross wind testing Simpson had been introducing the dogs to the water, giving them special training in connection with under-water mines. This is an important element in the program. It must not be supposed that if extrasensory perception is present it will automatically demonstrate itself when a given sensory function is rendered impossible. The

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animal naturally goes on attempting to use the sensory function unless some special training is given him to introduce the new situation and, as it were, break up the old habits of relying on a given sensory function.

The under-water tests were begun on June 26. Mr. Toole and Dr. Luman Ney of S.R.I. were present on the twenty-sixth and Toole on the twenty-seventh. On the twenty-eighth I worked alone. The results, given in detail in the July 15 report referred to, reduce to a very significant result. Whereas 20 per cent of hits are expected on a theory of chance, 38 were obtained, 18 hits out of the total of 48 trials given the dogs during those three days. The tests were conducted in the same manner as on land except that the water covered the sand. The sand hardened more definitely under water and the theory of contact with the feet was rendered inapplicable. Moreover, the sensitivity of the nerve endings in the dogs feet was greatly reduced by the coldness of the water on most of the occasions when the experiments were carried out. The lines were laid as far as possible so as to have a cross wind, and when this was not entirely possible the dogs were worked down wind as usual. The wind on the beach was usually strong and broke the surface of the water a good part of the time, making it difficult to see the bottom. Also, in the deeper water visibility was very low. Results indicated that success was no better where the visibility was better than where it was poor. Also, no relation was found between the direction of wind and success, whether or not the wind was crosswise or in line with the segment. By observation of the rate at which surface objects drifted across the segment line, it was obvious that any substance dissolved in the water or any particles given off by the mines would be carried several feet away before reaching the surface. A rough estimate of the rate of movement of the surface water was noted on the records. Tessie contributed most of the extra-chance success, although not all of it. The results were such as not to be expected by chance alone more than approximately once in five hundred such experiments. The best percentage of results and the best I have obtained on any occasion with the dogs was a 50 per cent success evenly distributed between the two dogs, obtained on June 27, with Mr. Toole collaborating.

Although forty-eight trials are not considered enough for a final conclusion and although the conditions under which the work had to be done were to some extent improvised, it has not been possible, in thinking over the situation and reanalyzing the data from different angles, to see any other explanation for the extrachance results than that some unusual perceptual factor was operating. Two things were very obviously needed to support the case made by these beginning results. One was the broadening

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of the base on which the conclusions would have to be made; that is, more data of the same kind. Another was the need for the introduction of another observer, particularly for the assurance of the reader of a report that the bias of the experimenter was not a major factor in the earlier results, although the cooperation of Mr. Tools in a share of them rendered that unlikely. However, it was possible to obtain the collaboration of Dr. Ney for a day now and then during the period following my own experiments at Marshall Beach. During the succeeding two months I was unable to conduct any further tests personally. Dr. Ney, however, put in a total of five days during July and August, 1952, and in that period he carried out, with Simpson and the two dogs, Tessie and Binnie, a total of 95 trials. Over this longer stretch his rate of success exceeded that which I had obtained (44 per cent to my 38 per cent). Dr. Ney's tests were carried out under the same general conditions. It was he who introduced the excavation only at the center of the marked off units instead of making a trench all the way along the segments. I omitted to state that when the tests were introduced to the water stage it was found necessary to mark the trench line by a white parallel tape line, and it was found convenient to mark off the units by a bit of tape in order to facilitate the operation of the handler as well as the checking up on the results. Whatever it was that had given me the earlier significant results with Tessie and Binnie was now confirmed by Dr. Ney who was frankly noncommittal with regard to the occurrence of extrasensory perception. In a summarizing statement Dr. Ney took the position that while he did not know what the adequacy of the water control over olfactory stimuli was worth, he could see no explanation for the significant results obtained. He was satisfied that other factors had been eliminated.

Early in September it was possible for me to complete the minimum requirement of 100 trials, which I considered advantageous if not necessary for an adequate statistical foundation for the test evaluation. During the period from the third to the fifth, I carried out with Tessie and Binnie, at the same testing site, thirty trials each or a total of sixty. In this second phase of the series my percentage of success dropped from 38 of the first period to approximately 32 per cent. The total of 108 trials that I had conducted with Tessie and Binnie up to this point where the series ended had given a total of 37 successes where 21.6 were mathematically expected - a little better than 34 per cent instead of 20. The CR obtained by the binomial method is approximately 3.00 and the series is definitely, then, a significant one although not so significant as Ney's whose CR is 5.90. The two series pooled give a very

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significant result but there is no need to emphasize the fact that something was going on besides chance.

The greatest concern in the minds of all who had to do with the experiment was over the adequacy of the elimination of chemical stimuli. Was this under-water test, carried out as it had to be, in a shallow pool just back of the beach, providing the blanketing of olfactory stimulation that was the objective of the experiment? Was the crosswise movement of the water under the impulse of strong wind a sufficient guarantee? There were indications at the time that favored the impression that the dogs were not, in these water tests, relying upon their noses as they manifestly did on the land. This, however, is not the absolute order of assurance that we want. During the September tests I decided to make some observations on the movement of water across the segment line under the influence of the wind with various indicators introduced to make obvious what was going on. There is no need to review the various unsuccessful or partially successful attempts. Some of these involved the efforts to set up threads or tracers to indicate the movement of the water, but the difficulties of finding under the circumstances the exact specific gravity of substance needed proved too great. The use of small packets of dye such as methylene blue was found useful, but the method that gave the best results was the use of ordinary milk released with a rubber water pistol. Milk, being colloidal and having fat droplets that are lighter than water, afforded the best sort of test for the purpose. The milk could be released right on the bottom and the distance measured at which the cream droplets first reached the surface and then the greater distance at which the protein particles or globules came to the surface. The conditions under which the tests were made were essentially typical. The wind varied in puffs from ten to twenty miles per hour as well as could be judged without instruments. The extreme puffs would ripple the surface of the water. It was noted that first of all there was no backward movement or undertow. At no time was there a reverse direction taken anywhere along the segment lines that had been used. At the surface the movement was approximately one foot in from six to ten seconds. A few inches below the surface the rate was of the order of one foot in twenty to thirty seconds and at the bottom, at a depth of approximately ten inches, it took about two minutes for a movement of the milk a distance of one foot. The cream droplets were first visible at the surface at approximately a yard from the point of release. The rest of the milk did not reach the surface in undisturbed water within two yards. There was, however, one more control that quite accidentally was made possible by the fact that on the sixth of September the beach was, for a short time, almost windless. During the only time in my experience when the pond lay with an undisturbed scum over its surface - a light scum of small drift particles but enough to indicate that there was no surface movement. It was decided to put the dogs through ten more trials each as a control, with the idea that if they had been

locating the mines by the sense of smell the rate of success would go right up. For the purposes of evaluating, this short series was definitely labeled as a control and is not to be considered as a part of the series of 108 trials which was considered completed. Actually these 20 trials on the sixth gave only three successes where four would have been expected from chance alone. If still water did not allow the dogs to locate the mines by olfactory cues it is not likely that the moving water in the main body of the test could have been letting through any chemical substances for the noses of the dogs to pick up. Still one further control seemed in order to round out this investigation a bit further. During the three days in which the last sixty trials of my series had been conducted, on the third, fourth and fifth of September, the percentage of success had been as follows: 45, 30 and 20. Then followed on the sixth the control period in which the percentage dropped to 15. This decline of rate of scoring was typical of extrasensory perception but not of sensory functions. It had been found to be a fairly common characteristic among human subjects that are put through a long series of repeated tests. As I have already indicated in earlier technical reports, this is precisely what Dr. Osip found in his test of cats for extrasensory perception, a decline of scoring rate with a continuation of the same monotonous test. It seemed logical, then, to ask whether the dogs had declined in their ability to locate mines on the land as a means of differentiating between the two abilities, if there were two. Taking the dogs back to land tests should bring out at this point whether or not a different order of factor had been involved in the water than had been used by the dogs on the land. There was time for only a short series of ten runs, five with each dog, but when Tessie located all five of the mines buried in the sand and concealed with the same caution and controls that had been carried out in the water, except for the water itself, it definitely looked as if something different was operating. Binnie, who had been somewhat roughly treated in trying to reactivate her in the water tests, did not behave normally. She located only two of the five, making 40 per cent. Seven out of the ten mines were located, making a 70 per cent score, altogether a different one from the performance in water. Altogether, the figures obtained by Ney and myself independently, along with the control tests with the dogs in calm water and on land, and the observations on the crosswise movement of the water under the impulse of wind, and, finally, the obvious loss of ability in the water without any comparable loss on the land, makes a case worth considering for the presence of an extrasensory perception factor in these dogs. There is no need to make this any stronger than the facts themselves. If the results obtained by Ney and myself are what they seem to be, others could be obtained. It must be kept in mind, however, that very delicate factors are involved and that, as is obvious in the decline of Tessie and Binnie, they can easily be obscured. That is the general picture obtained with the other animals and human beings.

At this point it seemed obvious that several things were needed; first, more dogs, since Tessie and Binnie were evidently played out so far as ESP is concerned. However, since I placed the animals at the disposal of Dr. Ney and he tried them on mines buried under ground and found them quite as capable as ever, it was clear that they had not been ruined so far as the general purpose of locating mines was concerned. In fact, it was hoped that eventually they could be recovered for further work in under-water tests. But it was necessary to obtain new dogs and the training of three more was undertaken by Simpson with a view of selecting the two best for intensive training at a later stage. Also, an arrangement was made with Dr. Ney to use his two best dogs, Caesar and Venus so long as, in Simpson's judgment their special training for the water would not jeopardize their capacity for work on the land. The most urgent of all was the need for a more accessible and convenient place for training than the Marshall Beach which required at least four hours travel for the round trip. A small artificial pond on the grounds seemed the only possible solution and this was undertaken. A matter of this kind is necessarily experimental; and Simpson, caught between two highly exploratory projects in addition to other responsibilities probably can be excused if he is considered a probable limiting factor in the situation as it developed. Briefly, an effort was made to concentrate the various lines of effort on a showdown demonstration in December, 1952. The main objective had been to try to economize enough by the arrangement of the artificial pond to enable Simpson to concentrate on the water tests and training of the dogs. It is impossible to appraise the various factors involved. I am personally inclined to think that some needed factor gave out in Simpson through the long, tedious period of training and retraining of these dogs. While there was sufficient monetary reward, there was not the reward of daily demonstration with recognized success which he was simultaneously getting from his S.R.I. work. In retrospect it is easy to see that the tests for this hypothetical ESP factor in dogs ought not to have been mixed up with and paralleled with the sensory tests. Moreover, in the cold, rainy period the pond became a rather messy mudhole, whereas the trips to the beach had been in the nature of an outing. Certainly I can say that during my four day test period with Simpson in December, from the second through the fifth, he was personally not himself. He was manifestly nervous, slightly irritable with his dogs, and, judging by little signs which one learns to look for, not enthusiastic about going on with the project. In my judgment he was frustrated and was dealing with something that was beyond him. Although he had, I believe, good encouragement and backing from Dr. Ney, even though the matter was not one with which Dr. Ney was directly or professionally concerned, there was some evidence that a difference had developed with William Johns, and Johns had been the main source of the idea of the under-water test, and it was he who had sold Simpson on the idea that there was an extrasensory

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factor involved. It is hard to say whether Simpson still holds to that conviction or not. He says he does. With this introduction on the personal angle, I turn now to the actual results. They were all explainable by chance and there was not in any dog's performance or any day's work any exception to this. In a total of 87 trials made in four days, the results were almost an exact approximation to the expected chance average. One thing that was rather conspicuous was the refusal of the dogs to alert. This was true especially of the new dogs, Scamp and Dusty, but it was true also of Venus and Tessie, old, experienced dogs. After failure with the mines, traps were introduced with the hope that the more menacing object might produce better results, but they did not. After three days of utter failure and the depressing experience of having nothing on which to build any further interest, it was decided to spend the last day available at the old test site of Marshall Beach and to try out a number of the dogs, old as well as new, in the situation there. Tessie and Binnie were taken and the better of the two new dogs, Scamp. Scamp would not alert in the new situation (new to him) and Tessie and Binnie went through twelve trials with only two successes. The conditions at the beach offered no explanation for their failure, and the December tests as a whole cannot be interpreted except in a very guarded, speculative way, at best one can say that they confirm, in a way the earlier work. Certainly there were no different precautions taken, but they suggest, and it is only a suggestion, that something had changed in the very vital factor of Simpson himself. I would insist that it is no reflection upon him to make this judgment, and its only value would be in guiding future research; first, against too much mixing up of interest in a single co-worker whose role is so important; and, second, in concentrating so much of the essential responsibility in one individual, and perhaps a good third, of attempting to force through in a too limited time a basic research exploration that by any reasonable calculation should be a matter of some years of exploration. At any rate, these later negative results do not cancel the earlier ones with Tessie and Binnie. Indeed, they may give us some light on what we are up against if we are to discover what this added element is that apparently goes beyond the range of the senses. I need not emphasize what the importance of this factor would be to a military power who first acquires understanding and control of it. Obviously that will not happen over night. I doubt whether, outside of this Laboratory, there is anywhere in the world today the patience and the perspective to undertake it. With the termination of this contract we assigned our dogs to Dr. Ney and closed this phase of our investigations from necessity.

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IV. Experiments and Results on the Problem of ESP in Animals, with Special Reference to Dogs.

In view of the limited interest of Messrs. Goff and Toole in this branch of the investigation, I shall be more brief in summarizing the developments. In any case, these will be available in publication in The Journal of Parapsychology. The first step taken was to survey animal behavior with a view to finding the largest gaps of unexplained behavior in the hope of finding suitable points of attack. The general aim, of course, was to see whether ESP played a part in this unexplained behavior. Anything learned in this way should be of enormous help in knowing what to expect from dogs; knowing whether there is a species better adapted than dogs to the purpose of locating mines, and discovering whether there is a species better suited to the further study of ESP necessary even if dogs are going to be used in the location of mines. To cite one point for the justification of this spread of the program to other species I need mention only that if we can find a species that will enable us to work fast and under easily controlled conditions toward the objective of finding out the essential nature of ESP and thereby getting control over its functioning, we might, after the manner of science in the past, steal a march on the slow delays and difficulties that accompany working with dogs. We might be able to come back to the dog with a well-packaged formula of how to go about controlling this mysterious factor that evidently is more easily lost than found. From the survey made of unexplained animal behavior, one of the obvious mysteries chosen for further work was that of homing. The best species for such work was considered to be the pigeon. Work was begun by setting up experimental pigeon lofts and designing research procedures to carry that problem further on than had hitherto been done. Cooperation with experts in the field has been very successful, and Dr. Pratt, who is in charge of this branch of the inquiry, has now the assured cooperation of the leading expert, Dr. Gustav Kramer, to the extent that Dr. Kramer has already spent two months at the Laboratory in collaboration with Pratt and plans to come over during the succeeding year if finances can be arranged. He has promised to send his assistant for another period of assistance. At this point all that can be said concerning the question of whether ESP is involved is that Kramer's work has successfully eliminated every other existing hypothesis that has been proposed. It is not known, then, how the pigeon does it. ESP is the only established principle in nature that would work. Whether it is the explanation Dr. Pratt is designing tests to determine. With the aid of a mobile loft and a design for the setting up of different release points and different loft locations, he has what he considers to be an ESP test for pigeons. The necessary breeding operations, of course, require time.

The branch of the inquiry that has been most successful in terms of coming to the point regarding ESP in animals, likewise, grew out of the original survey on unexplained animal

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behavior. I refer to the studies of psi capacity in cats by Dr. Karlis Osis of this Laboratory. By psi capacity is meant the behavior of a human being or animal that does not fit into the framework of explanation based on physical principles. Dr. Osis worked with cats because cats had figured prominently in the reports of unexplained animal behavior, especially in cases of honing, both experimental and anecdotal. Cats are easily obtainable and offer many advantages to the experimenter that dogs do not. It was possible for Osis to go right to work with cats instead of waiting for six months or more for the training of dogs. Furthermore, most of the things reported about dogs that suggested the possibility of ESP as a factor were claimed also for cats. Psychologically, the animals are close enough together to make a transfer of findings from one species to the other fairly likely; as will be seen, an enormously greater number of experimental trials have been made with cats in the psi tests than were made with dogs, limiting the operation to tests with mimes. Much of what we are able to do with the dogs has been learned from the cat experiments. I will not repeat in detail the procedure and results of the work by Dr. Osis. Along with my report for July 9, 1952, I sent a copy of Dr. Osis's first paper as appendix C. Another report is in preparation at the moment and will be in publication within the next few months. A brief summary of these two papers may be of some interest. In the first the effort was made by the experimenter to influence the cat to eat from one of two dishes, both of which contained food in the same amount and kind. The experimenter was screened from view and, of course, remained completely silent. A second observer recorded the behavior of the cat without knowing which of the two dishes was target. The results are statistically significant. They are conspicuous largely for the rapid decline of ability in a short period of 200 trials, so that the first 100 for each experimental series with a given cat is likely to be positive and the second half is likely to be quite negative. Other differences were observed, too, such as the much higher performance in the forenoon than in the afternoon. Altogether the thing that stands out is that the ability that is being measured is a very elusive and delicate one. The second phase of the experiment is one in which food was presented in one of two boxes without the experimenter knowing which box contained the food. The olfactory stimuli were controlled by a constant current of air being blown over the food boxes in the direction away from the animal. Here, again, the results are statistically significant but it is evident that there is a very thin margin of evidence and a great number of trials were necessary to accumulate the significance attaching to the experiment as a whole. Some animals were spotted, as being consistently negative scorers, and some conditions were observed as likely to produce such consistent missing of the food box. This study was made a point of importance in the research, since the same thing has been found in the study of psi in human beings. A third branch of the inquiry consisted of a search for better methods of testing ESP in dogs, than that of merely using the under-water mine test. Efforts were made to capitalize upon the strong honing capacity

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of dogs. But the practical difficulties are too great for a short-term, limited-expenditure project. We have not given up on the possibility of devising such a test, but it would not be a useful, well-controlled one at this stage and in this part of the country. Another line of exploration was based on the dog's attachment to his master. A master-finding test was designed, partly with the help of Dr. Ney and Mr. Simpson. They carried out some tests with a dog especially attached to Simpson, but they did not get very striking results. They were likely to be good for a few trials and then the dog would form a side habit which could not be broken. Efforts were made here at the Laboratory to try the Osis test with dogs, attempting to influence the dog to go to one of two dishes of food. These tests were tried only on young puppies and, again, were not successful. The most promising test is one built on the retrieving capacity of the dog. Two objects are thrown out simultaneously with the command to retrieve. One of the two is chosen by a random method to be the target for a given trial. The thrower is supposed to will the dog to pick up the target object. The results are encouraging enough to consider this an acceptable test, and the results already obtained by Mrs. Esther Foster of this Laboratory would justify a continuance on a large and varied scale. It is the kind of test on which cooperation can be had from a number of co-workers once we standardize the procedure well enough and develop printed instructions and recording blanks.

The study of anecdotal material continues, partly with a view to getting suggestions as to what the animals are able to do naturally as a basis for what we might expect them to do experimentally. It is well to keep in mind that probably the whole idea of using dogs to locate mines grew out of the same order of casual observation and collection of anecdotal material that we are now pursuing in the search of better ideas as to how to investigate the factors involved in the ability. In looking for the extremes that nature produces only occasionally do we hope to find the effect which eventually can be produced under experimental control.

V. General Conclusions and Comments

Consideration of the overall picture after two years of study and experiment brings out certain facts and some judgments that are not so certain but may be worth listing. Dogs can be trained to locate mines when there are no gross or obvious sensory cues and there can be no doubt but that, for the most part, this is a sensory function, olfactory in type. This is of the nature of a hyperaesthesia, although the term is relative. Neuhaus is finding that the dog's olfactory sensitivity is enormously higher than that of man, as, of course, general observation has led us to suspect. Second, it turns out, however, that if the dogs are further trained to adapt themselves to working in water, where there is presumably no differential olfactory stimulus given, it is possible for them to locate mines with wind and water moving across the pathway of approach so as to remove any possible chemical stimuli coming from the buried mines.

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----- In view of the conditions and the control tests made, it is difficult to see how any olfactory basis of perception could be provided, and the only reasonable conclusion, although it is a tentative one, is that extrasensory perception, either in the man or the dog, has been operating in the underwater tests carried out by Dr. Noy and myself. Third, extrasensory perception has been demonstrated not only in man but in other animals, and the results obtained in the underwater tests harmonize well both in their percentage levels and the declines of the ability with the results obtained from cats and human beings. In fact, the only study on record of the telepathic ability in a horse reports the same disappearance of the capacity with the passage of time. It would be important to the general project of using animals in the interest of defense to explore this distribution as far as possible and especially attempt to discover whether in more simple animal forms there is a greater amount of the ability or whether it is less interfered with by the processes such as habit formation. On the general principle that whatever happens in nature has lawful relations of some kind, it should be possible to accomplish something in the control and utilization of these capacities; everything useful was at one stage or phase found only in traces or in uncontrolled form.

While it may not be within the scope of specific interest of your Laboratories, this research has opened up possibilities of importance not only within but far beyond the scope of the projects specifically dealt with. It is a question only of how far ahead defense interests choose to look or how deeply basic a research program may be allowed to be. The problems raised on this project involve basic research that may remain in the category of the inapplicable for many years. Measured against this, however, is the enormous value, not only to intelligence but to application in a wide range of military uses, of any control utilization of the capacities which have now been established as occurring in men and animals under the heading of extrasensory perception.

VI. Appendix

None

VII. Contract Financial Status

Covered by report of Dr. J.E.Markee.


J.B. Rhine, Director

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