

INSTINCTS

In this section we will discuss the subject of instincts and needs. Here we find behavior which starts with some internal influence; hormones, a stomach movement, a pain, a need for a mate-and we shall see what these instincts and needs cause the dog to do-those things which influence him from within. An instinct is an inborn precise form of behavior in which there is an invariable association of a particular series of nervous responses from specific stimuli. It differs from a reflex.

Instincts of dogs are of interest and a knowledge of them is fundamental to anyone attempting to train dogs, because we can take advantage of the highly developed specialties we find in the breed of dogs.

A good example of instinct is illustrated by the dog flea. A flea egg hatches one warm, damp day in August, in a crack of your living room floor. The little worm that emerges has never seen its parents which are probably dead from flea powder long before it hatches. No mother or father flea guides it to eat or tells it what its food should be, and when it has grown into a full grown larva and looks like a tiny worm, it has no parents to tell it when and how to spin a cocoon, nor when to chew its way out of the cocoon in its entirely new form. It crawls up the side of your davenport and stops climbing about a foot from the floor. Was it ever informed it should wait right there? Did its mother or another flea say, Little Jumper, if you stay here long enough something animate will come by and when it does, give a mighty hop in its direction? If by luck it landed on a dog nothing had to tell it how to hunt for another flea of the opposite sex and copulate so that more fertilized eggs could be laid indiscriminately so they would fall off the dog as long as the fleas were its passengers.

All of these acts of the flea are instinctive; they are inherited behavior patterns. There is nothing planned by the flea. The larva did not plan to spin a cocoon and pupate into a flea because it had never seen a flea, had not any way of knowing what a flea was, had no idea when it blindly did what its nature caused it to do, so that it would someday be a flea.

There is no knowledge behind instinct. It is a behavior pattern which does not need to be taught; like a puppy sucking, or a bitch making a bed in which to whelp, or a setter pointing. The instincts which are useful to each species have been fixed in the species by natural and some artificial selection.

An instinct is practically an inherited group of reflexes which involve the whole animal, not the reaction of say, one small group of muscles. In order to call one of these complicated reactions an instinct it is first necessary to be certain that the dog had no opportunity of learning it. It must be hereditary, not learned.

There are many actions which a dog performs, which, as we have seen, are the result of education, and there are others which he performs which are instinctive. He has never been taught to suckle his mother's teats. He never has to learn to urinate and defecate when he feels her warm rough tongue rub against the external organs from which he urinates and

defecates.

He never has to be taught to copulate when he is grown, or to bring food to his mate and youngsters. He uses his nose to analyze odors without training and he doesn't have to be taught to deposit his urine on trees and other places where it may identify him. The bitch doesn't have to be taught to lap her puppies dry as soon as they are born, nor to mother them, nor to protect them when they are in danger.

The breeds which have been developed by gradual changes in their heredity consistently produce dogs which do not have to be taught to do the fundamental things for which they were selected. Thus the bird dog doesn't have to be taught to be interested in birds. The fighting bulldog doesn't have to be taught to fight for a throat hold. The shepherd dog doesn't have to be taught to herd. The hound doesn't have to be taught to follow a trail, baying as he runs, thus warning the foxes and rabbits that he is after them. He just can't help either the pursuing or baying. The terriers cannot help wanting to go to earth and dig; and they don't have to be taught. The sight hound can't help running after the fleeing object any more than a baby can help following with her eyes a shiny ball moved before her. The sled dog generally does not have to be taught to curl up in the snow and sleep, he just does it naturally.

What is the basis for these natural actions? We speak of them as instinctive. Instincts differ from learned ability in that the former develops with the individual naturally without the necessity of experience and formation of habits, while the latter is dependent entirely on training and habit formation.

An unlearned response is based on a behavior pattern which is independent of previous experience. Our job in this section is to try to assess some of the unlearned behavior in dogs which is useful to ourselves.

Many psychologists while using the word instinct, tell us that actually an instinct is simply an inherited behavior pattern. So we shall follow their lead and while using the term instinct, understand that we are discussing inherited behavior.

Instincts can be used by man, can be altered by selective breeding and behavior patterns formed which are far more polished and exaggerated than those of the dog's ancestors.

These instinctive acts are the first of all acts; after the first, learning helps the dogs, so that most of his behavior through life is in some degree learned, not wholly instinctive. The central drive is hereditary, the modifications of the method by which the drive becomes action are changed by experience from which the dog has profited. A dog never has to learn what hunger is, all he has to learn is how to find the food so as to satisfy hunger.

It is not always possible to say whether behavior is dependent on instinct or acquired mechanisms. We should consider instinct as furnishing the foundations for learning. Learning helps to perfect inherited behavior patterns. Learning also may influence the direction that those patterns will take.

A well known instinct, which can be demonstrated to depend to a large extent on glandular

secretion, is urination behavior. We know that all puppies squat to urinate, that males cease squatting, and lift a leg and urinate against a post. Some may wait until they are two years old and some begin when teething is completed at from five and a half to six and a half months of age. This depends on the rapidity of growth. The testicles are maturing at this time and begin to secrete testosterone. If you want to see how testosterone causes an instinctive reaction, just inject some into an eight week old puppy and watch him, a few days later he will lift his leg like a grown dog to urinate.

1. GUARDING

One of these late developing behavior patterns is guarding propensity, or instinct. This is exemplified by the fact that puppies seldom, if ever, chase and bark at passing automobiles. When the dog start this behavior of his own accord, it is usually because of a drive. Shepherd dogs are more inclined to chase cars than other breeds, so within this action we probably have the manifestation of two drives-herding and protection. The guard dog is more likely to stand and bark, while the shepherd runs just as he does to pass a fleeing sheep or cow and round it back into the flock or herd. The dog with both aptitudes strongly bred into it is the worst car chaser.

2. CIRCLING BEFORE LYING DOWN

Dogs usually turn around many times before lying down. May this not be due to the fact that their forebears lived in grasslands and they had to make nests in the grass by turning around trampling out a bed for themselves.

3. PACKING

The packing instinct appears at times in dogs especially in those in the open country areas. Packs of hounds which regularly hunt coyotes together seem to be acting on the age-old canine instinct to keep intruders off their territory. Many instances are reported of the hounds running down stray dogs as readily as coyotes. Suburbanites can also tell you of dogs which guard whole blocks, driving all dogs away whenever they come near. The sight of another dog will almost always cause a dog to run in its direction, and only training will prevent such action.

4. SEX INSTINCT

Sexual behavior, at first is all instinctive. No one shows male or female what to do all the way from copulation through finding a nest and whelping the pups and all that goes with it.

By careless selection in breeding our forefathers have developed many unnatural mothers who are unable to raise more than a small part or none of their puppies without human help. The natural mother walks round and round her litter, pushing the puppies in a pile, and then lies down. But how many do this any more? Clumsy bitches often enter the nest box and plunk themselves down on top of puppies killing a large portion of their pups before they get the pups raised. But this fact does not necessarily indicate that puppy mothering is not truly instinctive in a natural bitch.

5. BARKING

What makes dogs bark? For one thing it is an instinctive reaction to surprise. It can be a useful warning to other dogs as the wolf's bark is to a wolf family. But some dogs learn that barking brings them something desired. It may be food which the owner in desperation brings to quiet the dog. It may be human companionship he barks for, or just to be loose from a chain. He may bark from lonesomeness-a fact to be remembered. Does he get satisfaction from hearing the noise he makes when he barks? Not at all. He has just as much fun but no noise comes out when he has been surgically debarked by a simple operation.

6. LEADING BEHAVIOR

What we may call leading behavior by dogs has proven useful for mankind on many occasions. And in a way this is related to the behavior of the wolf which shows herself or himself the hunter and then runs away, luring him after the wolf and away from the pups. Only those of us who have had the privilege of observing the action of many dogs under nearly natural conditions are likely to have seen it. For example: the cow dog who, finding a dog who, finding a cow has calved in a pasture, runs to the gate and by barking attracts the dairyman's attention. The dog repeatedly runs ahead of him and retraces his steps back to the farmer, then bounds on again seeming to express pleasure that he is succeeding in enticing his owner to follow his lead. This action is totally independent of training.

7. MATURATION

Another principle-maturation-is one, a knowledge of which may save you time and trouble. Every dog trainer needs to understand it. Maturation is the name given to the development of instinctive behavior. Dog trainers depend on the hereditary instincts and behavior patterns of dogs to a great extent.

We know terriers love to dig, hounds to trail, setters to point, retrievers to retrieve, sight hounds to pursue their quarry by sight. Now suppose we take puppies of one of these dogs-greyhounds for example-and start with a litter. We divide the litter of eight puppies into two lots. One lot we simply allow to age. The other lot we take out into the open fields and train to run after anything that moves-rabbits, cats, even other dogs. By the time the pups are ten months old we feel we have done an excellent job and have accomplished a great deal in the way of training. So now we tackle the four which had aged without training. To our amazement, we find that they do almost as good a job with no training as our trained four did with our long effort. Spontaneous development took care of the puppies and we see that much of our time was wasted.

This principle shows us the futility of expecting that young puppies will profit by training where inborn hereditary instincts are concerned, to a sufficient extent that our efforts will be repaid.

There may be a lot of debating about whether such action is instinctive. To be certain, it is necessary to show that it is a part of the behavior pattern of a dog who has never had an opportunity to learn it.

Instinctive need and enjoyment go hand in hand. Only man seems able to separate the two so that pleasure becomes an end in itself; dogs certainly cannot or do not do it, and are thus protected from excesses.

8. NEEDS

A need goes from inside out, as does instinctive behavior. To satisfy a need the dog acts on the environment before it acts on him. Conditioned reflexes are the opposite; the environment acting on the dog. Modern dog training should capitalize on the volition of the dog. This can hardly be sufficiently emphasized. He needs something, he uses his sensory apparatus and he acts. When the need is satisfied he ceases to act.

HOW DOGS LEARN

A dog, when left to his own devices, learns by the trial and error method. A dog trying to get through a fence, the wires of which are spaced wider and wider apart as the fence is higher, will make every effort to get his head through the lower holes. Finally, in desperation, he may stand on his hind legs and find that the wires up are far enough apart so that, by turning and twisting, he can slither through. After several attempts at the same fence, he doesn't have to try, but stands up, pushes his head through a hole and jumps. And he finally learns not even to hesitate, but to find a hole, twist sideways, and jump with his hind legs; he is through so gracefully, it is pleasant to watch him.

He learns, by painful reactions what he must not do. From early puppyhood he learns that his mother's growl means, "No, stay away." How does he learn? By hearing the growl and when he continues doing what he should not do, feeling his mother's fangs which hurt him and frighten him terribly. It is as though there were a fence made by the growl. The mother is eating and growling. If the pup stays his distance he is safe, but woe betide him if he crosses that invisible fence. And yet have you ever seen a puppy imitate his mother and growl to keep his litter mates away from food? Puppies are several weeks old before defense of their food begins to show. And this action is demonstrated even when a puppy is raised on a bottle.

How does a dog learn? Learn what? That barking will bring friendly companionship? That barking drives people away from his domain? To shake hands? That a flame will burn him? To drink from a pan? That bees sting? That porcupines are different from other animals? It is not easy to define the word learning. It has been suggested that the field of learning is equal to the field of psychology.

Psychologists are learning more about learning every day and will continue to do so for the some time. Without attempting to propound a definition we can say that dogs have now been studied so thoroughly that we have tools and methods to influence behavior profoundly and in a fraction of the time it formerly took to accomplish the same results. A dog's behavior shows what he has learned. Our job is to influence the dog to behave the way we want him to. As we shape his behavior he is learning the elimination of ill-adapted acts and the fixation of the adaptive facts.

It is most worthwhile to understand certain psychological principles, even though learning about them may require considerable study.

As we have seen there are two kinds of behavior, the reflex and voluntary. Many psychologists find fault with the terms reflex and voluntary, for many reasons and have changed them to respondent as a substitute for reflex, and operant as a substitute for voluntary. In this book we shall use the older terms which seem to be applicable to dogs. Operant and respondent are mentioned here to make clear what the words mean when you may see them elsewhere.

A good example of reflex action is the experiment employed to teach students in psychology laboratories. When a buzzer sounds, the student plunges his hand into a tub of ice water. Naturally the blood vessels in the hand contract, its temperature drops. The actions also effect the left hand which is not in the water. Every few minutes the right hand is dipped into the ice water at the buzzer's sound. At about the twentieth sound, the hand is not dipped into the water. What happens? The temperature of the hand drops anyway-a conditioned reflex.

Let us now analyze how a condition reflex takes place in a dog that is in narcotic detection training. During the initial training exercises and all throughout his employment career the dog is subjected to a degree of excitement prior to being encouraged to hunt for narcotic odor. This is called the conditioned stimulus. In training, soon after the dog receives the conditioned stimulus, he detects the narcotic odor, which is called the eliciting stimulus. The condition resulting from this exercise is a conditioned reflex.

Another principle which every dog trainer needs to know is; the conditioned stimulus must come shortly before the eliciting stimulus. If there is too great a time lag between the two, conditioning may not result at all, or if it does, the condition will take much longer to accomplish. Seconds only should separate these and the reward should be attained by the dog very shortly afterward-the principle of togetherness. What we do in training is to effect a new response to a new stimulus. This works either positively or negatively.

Still another aspect that was suggested by an American psychologist: Any act may be altered by its consequence. If a dog jumps up and puts his paws on a table's edge, and an empty tin can falls to the floor with a bang, the dog will be startled. If he jumped and a whole box full of cans came falling down on his head with the clatter accompanying them, the dog would be so impressed by fright, that he would be much less likely to jump up again than he would if only one can fell down.

Thus the importance of accustoming a dog to an environment before employing him in such an area cannot be overstressed. This conditioning reflex can also take place by training the dog in a specific area and employing the dog in a completely different type area. If the training is not accomplished in an area similar to that where the dog is to be employed-then difficulty may be experienced in the employment area. This is why it is so important to conduct training exercises in a realistic environment and in all areas where the dog may be employed. If the dog is conditioned to detect narcotic odors in specific locations and environments, then the association with narcotic odors in other locations and environments will not exist. When this occurs, some difficulty may be witnessed in the dog's degree of proficiency.

THE DOG'S MENTAL & EMOTIONAL STATUS

What we shall learn in this chapter may disillusion some persons, but it should help us all to have a sounder basis for training. How? Well for instance, if we know that a dog doesn't think to any considerable degree, then we can't expect too much of him; if we know his memory for odors is excellent, we can use that fact in training.

1. EMOTIONS

It is natural that we should start with a consideration of emotions because dogs live in the realm of emotions much more than in the realm of intelligence.

And, dogs resemble human beings more in their emotional behavior than they do in their intelligence. Many dog owners probably unconsciously harm their dogs by misjudging from their behavior, attributing to their emotions which they think they should have, when perhaps they don't. Such persons often harm themselves as well as their dogs by such misdirected sympathy.

Understanding dogs helps both dogs and owners. Our emotions are expressed by such words as fear, anger, cowardice, timidity, aggressiveness, calmness, jealousy selfishness, love, greed, shame, joy, exuberance, satisfaction, happiness, sadness and so forth. If dogs feel these emotions can we know it by any way other than by our observations of their actions?

And if dogs feel emotions, is there any degree of difference between them? Also, are the emotions dependent on glandular secretions as we know certain ones in mankind? What is known, briefly, about such matters?

Most of the studies of dog psychology have dealt with emotions. These reactions to stimuli are not reasoned reactions. Emotions exhibit themselves in many ways, such as timidity, boldness, aggressiveness, effect of stimuli on heart rate, and rapidity of respiration. The degree of the dog's activity is one form of emotional reaction, and the effect produced by noises is another.

2. FEAR

Fear paralyzes and extreme fear can result in a loss of almost all feeling in a dog. Terror in dogs is expressed by an emptying of anal glands, which act may be regarded as symptomatic of an acute state of fear. Various guesses have been made at the purpose of these glands with their acrid odoriferous material. To the dog its own odor is not obnoxious, but to another dog a strong dose of anal gland odor is so repulsive that, in a dog fight, the winning dog will often cease fighting and leave; in short, this is probably how a losing dog says uncle in a fight. One always smells the odor on a dog which has been a victim of an accident, and often on a dog after a convulsion, in which the dog generally experiences terror.

Fear is a strong emotion, stronger than others, far stronger than hunger, but it is not one of

those we can very often use in positive dog training because we do not want timid dogs. Fear of the consequences of certain actions can act as a deterrent, and that we can use.

Sustained fear is accompanied by increased hydrochloric acid secretions in the stomach. This has been measured in several species. The dog is no exception. He probably digests his food more quickly as a result, but the human being may develop stomach ulcers.

Dogs are often afraid of new objects, new situations. One investigator studies 26 home reared dogs with various stationary objects and objects with moving parts. He could tell what frightened the dogs by their avoidance responses, such as turning away from, running or crouching. The objects with moving parts were more frightening, but the dogs soon learned there was nothing to fear in these objects. Anything new may cause avoidance.

We often see signs of fear in a dog that is taken into a completely new and strange environment, especially if there are several moving objects and/or loud noises.

Dogs that have been raised since their puppyhood in a kennel or other such isolated environment will demonstrate fear, or at least some degree of apprehension, when taken into a new or strange environment more quickly than those that have been raised in an outside social environment.

In most situations where the dog displays fear of entering a strange area or around moving objects, he will gradually overcome it if he is handled properly. The dog should be gradually exposed to such areas and in such a manner to assure him that he will not be hurt. Normally if the dog is allowed to investigate such areas without being pushed, he will accept it quicker. Also, if the dog is allowed to do something he enjoys in such an area, it will aid him in accepting the environment. This may be no more than allowing the dog to play with a ball or some other object he is fond of, in the area.

3. FRUSTRATION

If a dog becomes frustrated, he may take it out on a leash or harness; chewing and fighting it, or other object at hand. This destructiveness therefore is a frustration reaction. The stimulus is present, but the dog cannot react as he usually does. Few dog owners realize how important frustration can be to them, especially those who own undisciplined dogs. Put any dog in a situation where he wants something badly, but is barred from obtaining it and he becomes either passive or frustrated. Many a hunter can tell you of his dog's actions when he had left him shut in the automobile and taken a companion dog hunting. He planned to rectum and change dogs, but when he returned to make the swap, he found the inside of his car a wreck.

In some situations certain goals may be reached by inducing a degree of frustration into a dog that is in training. For example: a dog that demonstrates an under aggressive attitude toward a narcotic odor that he has been trained to detect, may become more aggressive toward it if he becomes frustrated. The dog may also regress in his state of frustration, therefore it is extremely important that as frustration is induced, the dog must be rewarded when some

degree of progress has been reached and before the frustration causes regression.

4. NEUROSES

Dogs like human beings have phobias. Some fear heights, some automobiles, some fear other animals. Dogs do not become neurotic in natural environments. Behind every neurosis will be found some inability on the dog's part to solve a conflict which it feels it cannot escape. And dogs in kennels cannot escape, so occasionally one becomes neurotic. Take the circler for example, he has great energy, he feels cramped in his quarters from which he cannot escape, so he starts to run around. Soon he is running in as large a circle as he can within his small run. And before many weeks he has made a racetrack for himself. If this neurosis becomes established he will run in a small circle even when placed in an acre run.

Dogs which show mental breakdowns or those which develop abnormal behavior patterns under environmental stress, do so to some extent because of hereditary factors.

When dogs of entirely different breeds, temperaments and behavior patterns are all raised together in as nearly the same environment as possible. they all turn out differently. The difference depends on their inherited behavior patterns.

Dogs will develop neuroses as the result of finding they cannot perform a certain task with the certainty they will feel pain if they do not. This was established with both a German shepherd and a Basset hound. A weight was affixed to a foreleg. When a buzzer sounded, the dog was supposed to lift his paw, weight and all; if he failed to, he received a shock. The weight was gradually increased up to the point where he couldn't lift it. The fear of the shock brought on neuroses in the German Shepherd gradually and suddenly in the Basset. In human beings psychologists find that behind every neuroses lies an unsolved conflict, and as we have seen, the same is true of dogs. Our training should be as free from conflicts as possible. Switching a dog from one kind of behavior to another constitutes a conflict. Trying to make a dog behave in opposition to his native behavior patterns produces another kind of conflict. Square pegs do not fit into round holes in dog handling any more than they do in the case of human beings. People can, for example. cause neuroses in dogs by confronting them with problems too difficult for them.

When training a dog, the various phases must be established in such a manner as to provide a smooth transition from one step to the next. If this is done and the same behavior patterns are used, then the chances of the dog experiencing difficulties will be lessened. If, however, the dog is advanced in training when he does not demonstrate proficiency at his present level, then normally he will regress since he may be confronted with problems too difficult for him. In this case not only has the dog failed to progress, but he has regressed in his previous level of training. The dog should never be subjected to a training exercise that he cannot possibly accomplish.

5. INTELLIGENCE

Are dogs intelligent? Intelligence is the ability to use one's past experience effectively for the solving of present problems and the anticipation of new ones.

What a dog can find out of its own accord with no human help is the test of its intelligence. How can intelligence be tested? By arranging some problem for the dog to solve with no help from a human being. How quickly the farm dog learns by himself to catch woodchucks is one test. How quickly he can solve a puzzle box is another.

Real intelligence is the capacity of faculty for understanding, not for learning. So in this predicament the dog is not really intelligent. But set him at some natural job, such as catching woodchucks and it becomes evident that some dogs master the knack far more quickly than others.

A good measure of canine intelligence is how few mistakes the dog makes in learning a new problem.

6. WILLINGNESS

This is probably one of the most influencing factors that will govern the dog's success in narcotic detection training.

As you will learn, in this method of training, the dog must possess a near frantic desire to retrieve an article. This is one of the first factors that demonstrates his willingness. This is further generated by the dog exhibiting enjoyment in performing a task. In order for the dog to be successful in narcotic detection training, he must possess and demonstrate a strong degree of willingness. This can be induced through motivation, which is the result of an effective reward system. Without this, you may find it very difficult to train a successful narcotic detector dog.

Although a great number of dogs are very capable of learning and performing a task, they are not willing to apply their attention or energy to do so. In some cases, this may be overcome by using a different technique of training. In other cases it may not.

As you learn and understand the method of training described in this book, you will find that emphasis is placed on the enjoyment each exercise represents to the dog. In essence, training is a game to the dog. Through appropriate reward, the dog becomes highly motivated, or willing, to locate a narcotic odor. He demonstrates this willingness through excitable actions as he hunts for and responds to the narcotic odor.

In many cases the degree of willingness displayed by a dog may reflect the actions of his handler. In other words, the dog may initially demonstrate a very high degree of motivation and willingness. However, if the handler does not possess the same attitude in his actions, the dog will consequently regress in his. In other cases, the handler may generate increasing degrees of willingness from a dog through his excitable attitude and actions.

7. MOTIVATION

As previously discussed, it is normally through proper motivation that we induce or maintain willingness in the dog. All of which is a result of the reward system. During the initial stages of training, such as obedience and confidence course, an intangible reward is used. This consists of the handler effectively conveying verbal and physical praise to the dog.

When narcotic detection exercises are initiated, the primary reward system becomes tangible, since the dog retrieves the retrieving dummy, with attached narcotic, and he and the handler play a tug of war game with it, over its possession. This type of reward system continues throughout all narcotic detection training exercises and employment.

Since the dog's desire to possess the retrieving dummy and play the game with the handler is very enjoyable to him, he becomes highly motivated and willing to hunt for a narcotic odor.

As the success of the dog's training depends on an effective reward system, then it becomes essential that the handler put forth maximum effort in rendering the reward. In other words, If the handler is verbally and physically praising the dog, he must demonstrate and express an attitude of sincerity. As you will learn, even the tone of voice used In training a dog b very important. Therefore, In rendering verbal praise, the voice must project a very excitable and pleasing tone to the dog. The same principle applies to rendering physical praise to the dog. He must associate that the handler is pleased If he is going to be properly motivated.

8. ENERGY

As we have previously discussed, each dog Is different. This is especially true when referring to the degree of energy possessed and displayed by the dog. This is an extremely important factor that will influence the success of a dog in detection training.

Normally, the dog that has a high degree of willingness is properly motivated, thus, he will display a high degree of energy. This type dog will most likely succeed In training. The lazy, shiftless animal which shows no energy whatever, 18 normally difficult to motivate. Consequently, his chance of becoming a successful narcotic detector dog is very limited. As you will learn In the section on animal selection, this type dog will not be accepted for this training. The average, successful narcotic detector dog is one that is hyperactive and wants to be doing something all the time. He is very inquisitive and alert to all happenings. Normally this is a happy dog that works very fast, which results in him accomplishing a task In a minimum of time.

During detection training and utilization, a method is used whereby the dog is not allowed to needlessly expend his energy. This method consists of placing the dog in a crate, or other area of similar size, when he is not actually engaged In a training or employment exercise. This prevents the dog from becoming bored by idly standing or walking around with the handler, and also conserves his energy. This method also serves another very important factor. When the dog is not being utilized, and is in the crate, the handler is not near him. This causes some frustration since he is separated from his handler. As a consequence, when the handler

returns to get his dog for a training or employment exercise, the dog becomes very excited and is anxious to be removed from the crate. The dog's energy level at that moment is very high, which in turn reflects favorably in his performance. This method of allowing the dog to expend his energy productively has proven to be extremely successful.

5. SENSITIVITY

The sensitivity of a dog will indicate the type and degree of response he may demonstrate toward certain conditions. Sensitivity is an extremely important influencing factor which may govern training progress. As we discuss the different degrees of sensitivity, you will learn how each are displayed and what their effects may be.

a. Under sensitive

A dog that is under sensitive may be very difficult to train. He is most likely a very independent animal and will not easily become attached to his handler, or indicate any significant desire to please him. He may appear to be very stubborn and display a neutral attitude toward both correction and praise.

Although the narcotic detector dog is trained to be very independent in his detection phases of training, initially, he should develop a close rapport with his handler and respond to praise and correction.

The attention of an under sensitive dog is normally focused on doing only what he wants to do. Therefore, it may be very difficult to motivate him toward successfully performing a training exercise.

b. Oversensitive

If a dog reacts excessively to a given condition, he may be oversensitive. This type dog is usually very difficult to successfully train. He is normally so handicapped from being afraid of different sounds, distractions and situation-Q, that he will not likely demonstrate a sincere willingness to perform a task.

A dog that displays this degree of sensitivity should never be accepted for narcotic detection training, since there are many different types of environments he will be exposed to and must readily accept.

c. Moderately Sensitive

This type dog is somewhat sensitive to both sound and touch, and is the ideal type for detection training. Normally, he will readily accept new environments, and any distractions they possess, without any difficulty. He will respond to correction and praise which will enhance

successful

progression of training. The moderately sensitive dog will normally become highly motivated with the proper stimulus. Thus, his degree of willingness to perform a task is very evident through his excitable actions.

We see that the dog's behavior is never unlearned. The causes are impressions made on the brain by happenings (stimuli). There are many organs whose task are to receive external stimuli and transmit them to the brain for appropriate action.

G . THE DOG ' S SENSES

1. HEARING

A dog is born into the world deaf. His ears are closed until about the tenth day of life, and then what he hears is of small consequence to him as compared with the impression what he hears makes on his mind so he becomes mature. His mother's barking, growling, or that of other dogs, are not instinctively reacted to. He has to learn that a growl is generally followed by a pain inflicted by teeth. He gradually learns that what we call barking means that he must be alert.

Hearing is accomplished by pressures. Everyone knows what a dog's ear flap looks like and the hole which it surrounds, which leads into the head. All the delicate mechanism of hearing is embedded in the heavy bone at the base of the skull. Technically the outer ear which we see is the auricle. In dogs with natural erect ears, these cone-shaped organs can be moved to better collect the sound waves and conduct them down into the cavity where they vibrate against the ear drum. This is a membrane which lies across the end of the auditory opening and is very thin and delicate. It has no vibrations of its own and is able to pick up vibrations of a variety of lengths and intensities.

In a matter of hearing, dogs and human beings live in the same world, but at times quite different ones." In other words a dog can hear everything we can hear, plus sounds we cannot. "He can hear fainter sounds coming from a somewhat greater distance." He can hear sounds of much higher pitch than we humans can.

In order to better understand the dog's sense of hearing you should know what a cycle is. "An electromagnetic wave—a sort of vibration—is given off by a transmitter of some type—a noise-making device. Anything which makes sounds sends off waves which must reach an ear to be heard, or an instrument to be detected. The waves carry some distance and lie down, just as a pebble dropped in water causes a series of concentric waves which die out in a few moments.

The frequency of the vibrations—cycles—can easily be measured by a meter made for that purpose.

A man's hearing capacity begins at about twenty and stops at about 20,000 cycles per second. Dog's start at about twenty but go up above 30,000 and some experiments claim as high as

from 35,000 to 70,000.

Besides the cycles we must consider pitch. This is the quality of sound that depends on the rapidity of the vibrations. We hear best at about 2,000 vibrations per second, a dog hears best at about 4,000. Dogs respond to sound to which we are deaf. The so-called silent or Galton whistle is heard loudly by a dog, while we hear only a hiss of air.

Loud noises elicit a much greater response than the same note when weak. Dogs may be trained to respond to weak signals but when their attention is on something else, it requires a sound of greater intensity to effect a response.

Thus you can realize that the volume and tone of voice you use in training dogs is of utmost importance.

Dogs that have been studied in a noise environment were found to have increased pulse rates, faster respiration and tenser muscles. Noise can require considerably more oxygen consumption by dogs and cause expenditure of fully 25 per cent more energy even when the dog himself is not exercising. This is a very important factor to consider, especially when selecting a location to kennel dogs.

2. TASTE

The senses of taste and smell function by the stimulation caused by dissolved chemicals. The receptor cells for taste are located in taste buds in the back of the tongue and in the soft palate. In man there are five kinds of tastes: sweet, sour, bitter, salt and metallic, and presumably dogs are also effected by these same sensations.

How then can a dog distinguish almost instantly between the flavors of two substances which are similar in appearance; fish and beef, for example, provided both contain the same amount of salt? By odor, of course. The difference in odor diffuses up into the nose. What we call flavors are to dogs, most likely odors.

Because of the feeding methods of the dog's forebears, he gulps his food. There is little need for chewing except to render his food small enough to pass through his gullet - an extremely expandable organ. In eating, the dog mostly tears away at flesh, using his back teeth to cut the flesh loose. With his powerful molars he breaks bones into pieces small enough to swallow.

He relies on his sense of smell, but very little on taste to accept or reject food. For this reason the dog is one of the easiest of all animals to poison. If the toxic substance has no odor, it may be gulped down regardless of how it tastes.

Dogs may not eat some animals when they are freshly killed, but after a few days of ripening they will eat them. This may partially explain why dogs bury food. Usually they will cover it shallowly with dirt.

There is no doubt that dogs enjoy the odor of ripened carrion. When a decomposed animal

body has passed the stage where the dog will eat it, he will often roll in it. Most suburban dog owners are fully cognizant of this fact.

In essence what you can realize from the foregoing, is that a dog uses his sense of smell much more than taste to select his foods.

3. TOUCH

The senses of touch and taste are less important to a dog than any of his other senses. With sight and hearing developed about as well as a human and with the sense of smell developed probably as high as that of any animal, the dog could almost dispense with his sense of touch entirely.

Dogs feel the heat and register it by panting which is the way they reduce body temperature, the evaporation of the water from the lungs and throat making marked reductions.

Vibrations felt through a dog's foot are about the same as those reported by man. That a dog actually feels the vibrations via the foot, and that they are not transmitted to the ear, was determined by tests with deaf, dogs.

Dogs probably also feel vibrations through the skin as can be observed by the actions of deaf dogs to the step of a person in a room.

A dog feels electric shocks much more acutely than does man. This is probably contributed to the fact that the dog has a higher salt content in his blood than does a human. In using electric currents in training, it has been found that a shock that is no more than slightly unpleasant to man, will have a profound effect on a dog.

We can realize from the foregoing that a dog's sense of touch plays no real important role in training, other than the physical praise and correction which may be rendered to him.

4. SIGHT

The dog does not see as much as a human being, but some dogs can probably see farther and some dogs can doubtless see much better than other dogs. Some breeds of dogs seem to have a better aptitude for identifying moving objects than others.

When we say a person sees more; we refer to the fact that a person can see colors while a dog can see only shades of grey, just as we see a black and white photograph. To better understand what the dog sees, some discussion relating to the construction of the eye is necessary.

When the eyelids are open, the eye appears as the front part of the ball. The large transparent part is the cornea, the white which encircles it is the sclera, the tissue under the lids is the conjunctiva.

Behind the cornea we see a colored area, the iris, with a hole in the center, the pupil. The iris has muscles which run around it circularly and muscles which lie radially in it. When it is dark, the circular muscles relax and the radial muscles pull the iris back thus enlarging the pupil. When the light is bright, the circular muscles tighten and the pupil becomes smaller, the eventual size depending upon the intensity of the light.

Behind the pupil lies a tough lens through which light rays pass and come to rest on the retina which covers most of the back of the inside of the eyeball.

Between the iris and the cornea there is watery fluid, the aqueous humour; between the iris and the retina is a thick viscous fluid, the vitreous humour.

How do dogs get around in the dark? Many animals have in the retina of the eye a substance called visual or retinal purple. Dogs have little or none of this, and where we have regeneration of visual purple which helps us greatly to see in dim light, there is none for our dogs.

But dogs have a system which opens the pupil greatly to allow more light through the lens—and besides this, dogs use organs of touch.

A dog has a wider scope of vision than we have. At least this was indicated by dogs that were used in a study. If a line equivalent to the horizon is considered as a base, the dog can see from 50 to 70 degrees above, 20 to 60 degrees below it, 100 to 125 degrees out to the side and 30 to 45 degrees on the nasal side with either eye" These figures most likely vary with breeds. A human being has a field of vision of 180 degrees (half of a circle) or 90 degrees on each side of his nose.

Every dog has to learn to use his eyes. If experience of blind human beings who gained their sight when adult are any guide, then a dog is learning all the time. At first he has to learn how his mother looks, how his owner looks, and he associates certain facts with the appearance. If a black dog bites him he may be afraid of all black dogs until he learns to distinguish among the black dog he

sees. If a person wearing a skirt steps on his toes he may fear any woman until he learns they do not all step on his toes. If he touches a red hot coal and is burned, he may shun all bright objects for some time" Thus we can realize a dog associates many likes and dislikes through his sense of sight, which is extremely important to consider in his training.

5. OLFACTORY ACUITY

Dogs, like human beings or mechanical sensing devices, possess inherent capabilities and limitations. The primary value of the dog as a detector is his ability to perform as a sensor mechanism. It is quite well established that the dog is very able to detect minute traces of certain odors and has a nose ability quite superior to humans. Some breeds are better endowed, nose wise, than others. Heredity, intelligence, and training will vary with each individual dog. There is little doubt that regular practice will improve both the working ability of the dog's mind as well as the discriminatory quality of his nose.

Since it is impossible to communicate with an animal, much of our information on smell comes

from studies on man. Accurate interpretation of human experiments is rather difficult since many odors provoke strong emotional reactions. Perhaps this explains how a dog remembers its first master many years later. It is the best developed of the senses in newborns, enabling them to root for milk. In humans, the other senses eventually become more dominant. Nevertheless, what we can learn from human experience and practical observation of animals can provide us with the background to approach scent work more intelligently.

Modern man has comparatively little need for his sense of smell (or olfaction) on a survival basis. One author postulates that there is no widespread, naturally occurring vapor that is both toxic and odorless. He feels that unpleasant smells in nature are associated with danger and our noses keep us away as a safety measure; i.e., sewage contains organisms which are dangerous to health. Many stimuli to the nose are ignored; some have strong emotional involvement of pleasure or aversion. The smell of roast beef to eat is very pleasing, but when associated with a flower it can be nauseating.

Some people have well trained noses. Two common examples are the blind and certain people who do night scouting. They learn to rely on their noses as a survival and navigational aid and are able to develop a much more acute perception than the average person. Man has a comparatively small and simple olfactory system and is thus considered to be microsmatic. Many four-footed animals including the dog have a keen sense of smell.

Such animals are macrosmatic and have a complex nose design as well as a rather large olfactory lobe in the brain. Often olfaction is their most highly developed sense.

The nose is constantly assailed by its environment and humans frequently ignore or suppress smells. Several minutes after exposure to the smell of cooking cabbage one may become totally unaware of it and easily perceive other smells nearby. This also occurs, to some extent, with dogs. And indeed, they are quite able to find one particular smell in an area laden with other odors. This ability is commonly referred to as discrimination. Discrimination in most cases requires a fine degree of training. It has been found that both human and animal olfactory performance is relative to the amount of training received. Discrimination of subtle odors may be very difficult. It is also likely that dogs, like humans, may become very disturbed by very strong unfamiliar smells. In this case, exposure to a wide variety of odors and environments should be part of the dog's training.

The sense of smell, or the interpretation of the stimuli to the nose, is quite complex. Fortunately, on a practical level, it is still possible, with some selection, to find a dog that is both willing and able to use its nose to find a particular odor or even several different kinds.

a. Anatomy and Physiology of Dogs

A good understanding of the structure (anatomy), and what is known about the function (physiology) of the nose will help the trainer and handler in both training and working the dog. Hopefully, it will prevent serious errors in handler judgment. A well trained dog will, on

occasion, seem unwilling to work. A closer look at the dog or the environment will often reveal a good reason as to why he is unable to use his nose in those circumstances.

Much of our understanding of smell comes from our human experience. A comparison of the olfactory system in dogs and humans should give some insight as to how dogs could very well do remarkable jobs of scenting. Certain breeds of dogs are less capable of scent work, as will be discussed later.

b. Structures and Functions

Nasal Plane—The hairless part of the nose, covered with a plaque like patterning that is individual to each dog. It houses the nostrils which serve as the entryway to the large nasal chambers inside. The nostrils are widened during the act of sniffing to draw in large volumes of air. The nose ligaments are well developed in mature dogs of the working varieties.

Vomer nasal Organ -A narrow tubular canal, starting near the front part of the nose, behind the canine tooth, and running along the floor of the nose. It has olfactory cells and 608 nerve bundles that connect it directly to the olfactory lobe of the brain. It is felt to be intimately connected with the olfactory sense. In humans, this organ is very rudimentary and sometimes disappears altogether.

Turbinates—Bony ridges covered with mucous membranes that slow down air movement by protruding into the nasal chamber.

Maxillary turbinates -have fewer olfactory cells but create turbulence to help heat and moisten the air.

Ethmoturbinates- Are located farther back, essentially filling the back half of the nasal chambers, and have the greatest concentration of olfactory receptors. The act of sniffing forces large volumes of air back over the ethmoturbinates and up the sinus openings, which are located in this region. The cross sections of the dog nose and the human nose are approximately proportionate. Note the great difference in the size of the olfactory areas. Most of the interior of the dog nose has olfactory tissue compared to the tiny recess at the upper posterior portion of the human nose.

Sinuses- Cavities in the bones of the head which are small at birth and enlarge with age. They are lined with mucous-like cells which may have olfactory capabilities.

Maxillary sinuses- Located in the roof of the mouth near the roots of the teeth. Infected teeth may involve the sinuses or vomer nasal gland, and thus may seriously impair the ability of the dog to use his nose.

Sphenoid sinuses-Located in the cheek bones. **Front sinuses**—Located in the bones of the forehead and have olfactory cells.

c. Nerves of Olfaction

These are comparatively large and very numerous. Note the multitude of five olfactory nerve fibers which cover the ethmoturbinate area. The nerves pass through tiny openings in the bone and go directly to the olfactory lobe.

Olfactory nerves—The individual cell bodies are located in the mucous membrane of the nose and axons reach up around the base of the cells so that almost every cell in the olfactory epithelium has a direct contact with a nerve.

Vomer nasal nerves- Many fibers unite to form six to eight bundles, then to one or two, which lead directly back to the accessory olfactory lobe.

Terminal nerve- Formed of several small bundles of nerves that start from the vomer nasal nerves where they enter the accessory olfactory bulb and head back along the bulb to connect with the forebrain.

Nasal Mucosa—A mucous membrane covers the whole interior of the nasal chambers. It is made up of several types of cells and secretes a brownish fluid as opposed to the clear fluid in humans. The greatest concentration is toward the front of the nose with occasional olfactory cells interspersed.

Goblet Cells—These cells produce mucous which bathes the whole interior of the nose. It keeps the membrane moist, moistens incoming air, and traps foreign substances. In the olfactory area it seems to serve as a solvent to trap odorous material.

Olfactory Cells (also known as receptor cells) are long narrow cells with about six to eight filaments at the upper end that protrude out and float in a mucous layer that covers all the cells. It was felt that the contact between these filaments and odorous substances was the critical factor. These cells are rather sparsely set near the front of the nose and become progressively denser toward the ethmoturbinates where they are very abundant along with sustentacular cells. Note the very close contact of each cell with the nerve ending.

Sustentacular Cells—These also are long rod-shaped cells with short fibrillar projections at the top. They seem to have the pigment factors that are responsible for the darker colors of the olfactory areas and areas numerous as the receptor cells in the olfactory regions. There is recent evidence to suggest that they may be the more important cells in receiving the odorous substance. In any case, the supporting cells and the receptor cells have a keyhole in odor sensitivity.

Basal Cells-A layer of cells that underlies both the olfactory areas as well as the mucous areas. They divide regularly, but it is not known quite how they contribute to the cell layers above. The healthy condition of the whole nasal lining is an important factor in scent work. Mucous membranes are easily damaged. It is worth knowing that, in many cases, the nose lining can regenerate after several months, even with some nerve damage.

d. Comparison of Human vs. Dog

The olfactory system is composed of the nasal chambers and the sinuses, which serve as receptor areas for scent and the olfactory nerves, which carry the signals to the olfactory lobe. It is in the brain that odors are recognized, interpreted, and filed for memory.

Illustrations 1, 4 and 5 show the comparison between man and dog. They are about proportionate for a human adult and an adult dog of the larger Macrosmatic animals (dogs) have a richer brown pigment in the olfactory areas, whereas, microsmatics (humans) have a yellowish pigment. This represents a sound reason for retaining the richness of pigment in working breeds of dogs.

One big difference between man and dog is the square area of olfactory sensory cells inside the nose. It is estimated that man has five million of these cells, while a German Sheep Dog has 220 million. A further breakdown of several breeds is as follows:

Dachshund	-125 million
Fox Terrier	-147 million
German Sheep Dog	-220 million

The cell count appears to increase with the size of the dog. It is unfortunate that a larger variety of dogs were not examined.

Nehaus found that the dog's sensitivity to butyric acid was 100 thousand to 100 million times greater than man's.

Moulton (1969) feels that the most probable advantage conferred by increased olfactory area is the enhancement of discrimination. Even a small increment in ability will enhance the detection of subtle differences in odors.

More recent data suggests lower levels of a dog's sensitivity as being somewhere between 10 and 100 times greater than man's. There is some variability depending on the odoriferous material used and undoubtedly, the ability and motivation of the dog.