### Soundness in the Dog and How to Recognize It

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We also wish to thank the author, Lawrence M. Kalstone for his permission to use this very clear article on what we all strive to produce.

It was pointed out many years ago that the activities of a living animal can be divided into two main categories. First are those activities that are internal and mainly concerned with the vital organs: the assimilation of food, the excretion of waste products, and the action of the endocrine glands.

The second category, and the one of more importance in the following discussion, concerns the external activities: the ability to secure food and the ability to escape from natural enemies—in other words, the ability to move. In the not too distant past, an animal had to be sound to survive.

With the domestication of dogs to fill various needs of their masters, specialized breeding began. Dogs were needed that could earn their keep. Shepherds found that they could triple or quadruple the size of their flocks if they had two or three good dogs that could keep the sheep under control and fight off the killing wild animals. In some areas, ranchers were entitled to only the land that their cattle grazed on, so they developed dogs similar to the Corgi and trained them to nip at the hocks of the cattle and drive them out over larger areas. Hunters found that they could bring home more game with the aid of a good dog to locate it for them—hence the sporting dogs.

Over the years, discriminate breeding has produced many fine breeds, each developed for a particular purpose. With the exception of perhaps a few toy breeds, all "working" dogs of any merit have one trait in common—the ability to do their jobs with the least amount of effort. Actually, this is a definition of soundness. The soundest dog is the one that moves with the least amount of effort.

Learning how to recognize this effortless movement is the first step in understanding good conformation. Why is it that so many people try to separate movement and conformation? How many times have you heard the remark "He has beautiful conformation, if only he moved a little better"? The only difference between them is that movement is an indicator of conformation.

#### UNDERSTANDING THE BREED STANDARD

Movement might be likened to a thermometer. A thermometer will indicate an infection in a person's body by reading higher than normal. But to know this, you must first know what normal is. You must have something to relate to. Everybody has a temperature, but what it is, in relation to what it should be, is what is important.

### The soundest dog is the one that moves with the least amount of effort.

Such is the case with movement and conformation; all dogs have a conformation and all dogs move, but before you can hope to evaluate how close this comes to perfection, you must first know why particular characteristics are called for in the breed standards. This can be illustrated by a quote from the Poodle Standard. Concerning the neck it states: "Neck well-proportioned, strong and long to admit of the head being carried high and with dignity. Skin snug at the throat," From this description. it could almost be assumed that the neck is an aesthetic virtue. It is, but there is much more. What do we know of the real reason for wanting a long neck? What part does it play in movement? If a dog does not have a long neck, what does this indicate other than the fact that it will no longer be able to hold its head high and with dignity? What does loose skin at the throat tell us? The answers should be obvious, but there is no doubt that many serious breeders would have difficulty answering them.

There are two major reasons for wanting a long neck, and incidentally, an arched neck. (Although the Standard does not call for an arched neck, it is found on all Poodles of merit.) The first reason is that the area around the arch of the neck is the anchor point for many muscles, tendons, and ligaments, including some that aid in moving the front forward. A longer neck permits longer muscles, thereby contributing to better movement because long muscles tire much less easily than short. heavier ones. They are also much quicker to respond. Almost all top athletes are long and sinewy for this reason. The arch acts exactly as does the keystone in an archway. It is capable of assuming the stress that is directed to this area of the neck.

The second reason for a long neck is that it aids in locomotion by helping to shift the center of gravity or balance point of the dog. A long neck has much more effect than does a shorter one—a principle of simple leverage. It should be noted that the most efficient dogs will not carry their heads high when moving, but rather will use a forward position. Carrying the head high is more of an acquired or trained characteristic. The head is carried forward for the same reason that runners or sprinters always lean forward with the upper portion of their bodies—to keep themselves in an unstable position—to force the legs to catch up with the rest of the body.

The snug skin at the throat is a good indicator of the dog's muscle tone. Sloppy muscles at the throat usually indicate the same condition elsewhere.

Before further discussing why certain structural traits are desirable, it is necessary to explain what movement is in the literal sense. This can be done by explaining two rather simple terms—gravity and the center of gravity.

#### THE CENTER OF GRAVITY

Gravity is the force of nature that causes everything to fall toward the ground. Drop a ball and it falls to earth; if someone pulls your legs out from under you, you fall—or perhaps it is more accurate to say that the weight of your body falls. Without being conscious of it, your legs have been pushing up to support the weight of your body with exactly the same force that gravity has been pulling down. As a result, a stalemate exists—you neither rise nor fall. (This is not completely true but for the purpose of discussion it will suffice.)

The center of gravity is an imaginary point in an object or person about which all forces are equal—the balance point. In a 30-cm ruler, it lies under the 15-cm mark; in a meter, it lies under the 50-centimeter mark. If you were to pick up a length of pipe 3 meters long, you would automatically reach to pick it up in the middle. You would be placing your support under its center of gravity—its balance point.

## Movement can be understood by defining the center of gravity.

Humans, like dogs, have a center of gravity. In humans, it is located at about hip level, toward the center of the body. In a dog, it is located just back of the shoulders and about one-third of the way up the body. It is not important to know the exact location of this point; however it is very important to know and understand that this is the balancing point. When it is moved out of position without changing the base of support under it, movement results—perhaps the start of a walk or trot or perhaps the start of a fall. When this center of gravity has a support under it (our legs), it is prevented from falling to the ground. If the center of gravity is ahead of or behind this support, it will fall either forward or backward.

Runners or sprinters run with the upper part of their body in a very forward position. When in this attitude, their center of gravity is in front of its base of support (their legs). Were their legs to become instantly paralyzed, their body would fall forwards to the ground. To keep this from happening, they bring their feet, one at a time, rapidly forward to put a base of support under the center of gravity.

#### MOVING EFFICIENTLY

This is what movement is all about. We push off with one leg, thereby upsetting our balance. To keep from falling, we quickly bring the other foot forward to check this fall. Each step taken is a potential fall to the ground, even though it seldom happens. We have learned from childhood to check these falls by proper placement of our feet. The reason that a child falls so often in learning to walk is that he has not yet learned how to control his reflexes governing the placement of feet. Movement is nothing more than upsetting balance and then changing position to bring it back under control. It is a series of controlled falls.

# The center of gravity in an efficient dog moves in as straight a line or arc as possible.

One of the criteria used to determine whether or not a dog is an efficient mover is the dog's ability to travel in as straight a line as possible—the shortest distance between two points is a straight line. It is important that the dog's center of gravity travel forward in as straight a line as possible. An example will clarify this point: walking for four or five blocks would not be too tiring. However, hopping for the same distance would be very tiring. Why? Because it requires propelling oneself much higher than is necessary to travel the distance forward. The body's center of gravity is being moved forward in an unnecessarily high arc-from the ground to the peak of the hop and back to the ground. Energy is being spent to move the body upward when all that is necessary is movement forward. Also, the legs receive an extra jolt from the hard landing after each hop. Ideally, the center of gravity should travel forward in a straight line parallel with the ground. This is impossible because of such factors as friction between the feet and the ground. The next best thing is to have the arc of movement as flat as possible. Walking helps to do this.

The goal of good movement is efficiency, and efficiency results from moving the center of gravity in as straight a line or arc as possible. In a dog, watch the withers. If they bob up and down too

much, something is wrong—usually the shoulder set.

#### WASTED ENERGY

Along with wanting the dog to move forward in a level fashion, as viewed from the side, we also want it to move forward in a straight line, as viewed from the rear. "Rolling" is a condition that exists in all dogs; some do it very noticeably, while in others it is hard to detect. This rolling causes the dog to move from side to side as it travels forward. Technically, this is known as lateral displacement. It can be graphically demonstrated using a pack of cigarettes. Lay a pack of cigarettes flat on a table with the bottom of the pack facing you. Picture the four corners of the pack as the four feet of the dog. A dog propels itself forward by using one rear foot at a time. Simulate this movement by pushing the pack forward using just one finger, placed on the bottom of the pack near one of the ends. You will find out quickly that it is impossible to do. The pack veers off in the opposite direction as soon as pressure is applied. Now turn the pack on its narrow side with the bottom still facing you and do the same thing. You will see that the pack moves forward in a much straighter line. If you were to push on the exact center of the pack, it would move forward in a perfectly straight line. In essence, this is what a dog does to minimize rolling. It tries to bring its feet as close together as possible when it moves. A better term to use in describing this action is "single tracking" or the "tendency to single track." A dog that moves with its feet under the corners of its body, in other words, parallel as you view them from either the front or rear, is an unsound dog. Too much energy is being wasted (Figures 1 and 2).

There is another factor involved in single tracking. When a moving dog is viewed from the rear, there must be a straight line of bone from the hip to the pad. The upper thigh, lower thigh, and hock must appear as one straight line (Figures 3 and 4). If there is a break in this straight line, the dog is a "close mover" and not a sound moving dog (Figure 5). The same principles apply when looking at the dog from the front with him coming to you. There must be a straight line of bone from the shoulder to the pad (Figures 6 and 7) and not the break in line, which will indicate that the dog is a close mover (Figure 8). Watching a dog move fore and aft are good measures of its soundness. (Note: Figures 3, 4, 6, and 7 illustrate sound moving dogs.)

#### THE FRONT ASSEMBLY

The hardest working part of the dog is the front. It has more functions to perform than any other

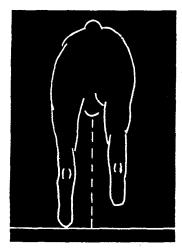


Figure 1

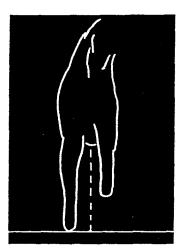


Figure 2

assembly and takes more of a beating. It supports the major part of the weight of the dog. It does this so that the hindquarters can be comparatively free to deliver full drive or power. (This is not to imply that the front does not supply power and forward thrust.) Try pushing down on the shoulders of a dog in show pose and then pushing down on the hindquarters; notice how flexible the rear is and how solidly the front is supported.

The front absorbs most of the concussion of each step. As the dog is propelled forward, it is the front

that checks the fall and receives the impact of hitting the ground. The front tries to maintain a comparatively level center of gravity, thus reducing the fatigue that is suffered in moving. The front also assists the hindquarters in moving the dog forward. With the rear portion of each step, an additional push is added.

The anchor of the front assembly is the shoulder blade, which attaches the front to the body of the

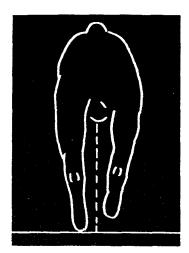


Figure 3

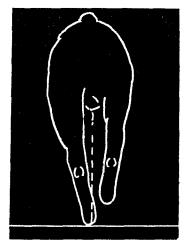
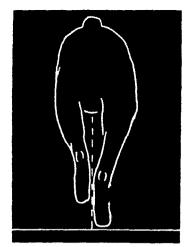


Figure 4



Flaure 5

dog. It is the shoulder blade, more than any other individual part, that determines what kind of movement a dog has.

A large number of breed standards state specifically that the shoulders should be long, long and sloping, or well laid-back. Many others infer this by using various descriptive terms, e.g., the angle of the upper arm and shoulder blade should approximate 90 degrees. The only way that this can be done without making the dog look like some-



Figure 6

## The front of the dog works the hardest in a moving dog.

thing other than a dog is to have long and sloping shoulders. (This explanation, although not completely true, is adequate for this discussion.)

Long, long and sloping, or well laid-back shoulders might be best explained as shoulders that form a 45-degree angle with the ground. Upright shoulders, which unfortunately are seen more often than any other kind, generally form angles of 55 to 60 degrees with the ground.

A 45-degree shoulder has two main advantages over any other configuration. First, it has two-and-one-half times more ability to propel the dog forward, and second, because it is longer, it can rotate the leg forward and backward in a longer arc. Due to the fact that the leg can come back farther, this type of shoulder propels the dog more forward than upward, thus reducing fatigue. The upright shoulder causes the leg to propel the dog in too high an arc, thereby causing undue strain and loss of efficiency. This would be similar to the hopping example. As mentioned earlier, watch the withers; top winning dogs will never bounce as they move.

The center of gravity is propelled forward in an arc. The top of this arc is the point where gravity begins to overcome the initial push of the dog. It is at this point that the dog begins to lose inertia and

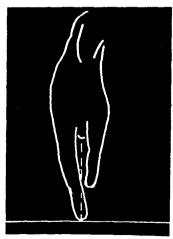


Figure 7

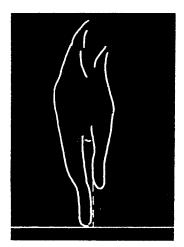


Figure 8

settles back to the ground to begin another step. The end of the arc is the point where forward momentum has been expended and gravity has pulled the dog back to the ground. This is the most desirable point for the dog to place its pad; it is here that the forces of gravity and forward momentum are at a minimum (Figure 9). This is the point where the front assembly will receive the least amount of shock from impact with the ground. If the shoulders are too straight (upright), the leg will not reach far enough forward to set itself down at the end of the arc (Figure 10). As a result, the leg . will pound into the ground before the forward momentum has been fully expended, and an extra shock will have to be absorbed by the front. This is called "pounding."

# A dog must have correct conformation to move efficiently.

#### **COMPENSATING MOVEMENTS**

In order to eliminate the strain of pounding, some dogs compensate for it by using their abductor muscles. The abductor muscles are those that bend the elbow and lift the lower arm. By using these muscles, the dog is able to lift its feet a little higher and to hold them there slightly longer (Figure 11). This high hesitation action enables the dog to put its foot down at the end of the arc, thus reducing the shock of pounding. This is called "padding" or "hackney gait." Although it is pretty to observe, it

is a severe fault in movement because of the tiring effect on the abductor muscles. It is probably more desirable than pounding, but this is open to debate.

Occasionally, a dog is seen that compensates for steep shoulders by using the rearing muscles of its hindquarters. When used for this purpose, these muscles add a little more lift than is normally necessary to drive the dog forward. This gives a higner but shorter arc, thus permitting the front leg to set down at the bottom of the arc. This is a little

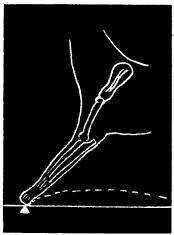


Figure 9

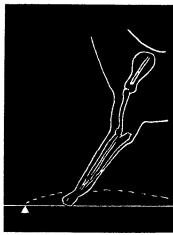


Figure 10

better than pounding, but not much. The front takes an unnecessary shock and the rear muscles have extra work.

Many dogs have been criticized for not stepping out with the drive that they are capable of with good rear angulation. They seem to move with a lackadaisical rear leg action. This is one of the compensating movements that a dog with straight shoulders may use. The listless drive of the rear minimizes the forward push and therefore cuts the reach necessary for the front. Probably this is the best method for counteracting upright shoulders; certainly, it is the least tiring to the dog.

#### SHOULDER LAYBACK

Long and sloping shoulders are not desirable for all breeds; in some breeds, slightly sloping shoulders are preferable. The former are found on dogs where speed and unburdened movements are desirable. Some breeds need power more than speed. The Chow-Chow, Alaskan Malamute and Bullmastiff are good examples of these breeds. As a result, their standards may call for moderately sloping shoulders. In conjunction with this is the desire for the rear legs to be just slightly or moderately angulated. This is in sharp contrast to the extreme rear angulation found on most breeds that call for the 45-degree shoulder. The moderately angulated rear tends not to propel the dog beyond. its shoulders and, most importantly, it provides more direct usable power. The most efficient way to transfer power from the rear pad to the dog itself is in a straight line. The leg with little angulation presents a more compact, straighter line than does a well-angulated leg.

It has been said that a dog cannot step beyond its shoulder blades. Breeders or exhibitors who are overly concerned with extreme hindquarter angulation should be aware of the fact that they may be creating a disorganized, unbalanced animal.

It is important to know how to determine a 45degree shoulder angle. First, the dog must be positioned correctly. Stand the dog in show pose, making absolutely certain that the heel pad on the front foot lies directly beneath the center point of the shoulder (Figure 12). Advancing the foot by as little as 1 inch can alter the layback of the blade by 5 or 10 degrees. As you move the foot forward, the angle becomes smaller. It is easy to change a 55-degree shoulder into a 45-degree one by careful posing. When you run your hand over the side of the blade, you will feel a ridge transversing the entire length. This ridge is the guide for determining the blade angle. Picture an imaginary line extending from the ridge and traveling forward to the ground. This line forms an angle of 45 degrees with the ground if the dog has a 45-degree shoulder angle. The proper reach for a dog is the point where this imaginary line touches the ground (Figure 9). Anything short of this will cause padding or pounding (Figures 10 and 11).

One additional point should be made concerning the shoulder. The blade is attached to the rib cage of the dog by means of muscles both on top of and

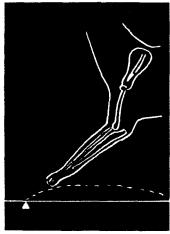


Figure 11

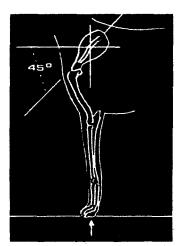


Figure 12

underneath the blade. These muscles act in pairs, as do all muscles; when one expands, the other contracts. Also these muscles are alike in size; if the outer muscles are heavy and coarse, the ones beneath the blade will be the same. Because of this, if there is a mass of muscles at the shoulders, the blade will be pushed too far away from the rib cage. This will give the dog "loaded shoulders." which in turn, lead to a dog being "out at the elbows." This condition is undesirable by the same reasoning that a solid, straight column can support more weight more easily than a bent column. If you stand with your knees flexed, you will tire a lot faster than if your knees are straight.

#### THE PASTERNS

The pasterns are more important to the soundness of a dog than most people realize. It is the pastern that truly acts as the shock absorber for the dog. Its action is almost identical to that of the shock absorber in an automobile. Proper ones cushion the impact of each step, thereby reducing the shock received by the shoulder. For most breeds, pasterns should not be straight, but rather they should have a slight but definite angle in relation to the bones of the forearm. This angle supplies a certain amount of "give" and as a result gradually diminishes the shock of each step. Straight pasterns have no give and thus pass the impact directly to the shoulder. There should be just enough bend between the forearm and pastern at the joint so that a difference in the line of bone can be seen. In general. Terriers usually have straight pasterns and other breeds a slight bend. German Shepherds usually have an exaggeration of the latter-to their . detriment, in many cases.

#### IMPORTANCE OF FEET

There are two types of feet common to all dogs: one is the cat foot, a roundish type found on most breeds of dogs, and the other is the hare foot, which is slightly longer than the cat foot and found on most of the gazehounds (the speed dogs). Either of these feet is correct as long as the foot is tight and compact. The most important reason for a good tight foot, of either variety, is to supply leverage to the leg. If you rock your foot back and forth on the floor, you can easily see how much leverage is applied. A splayed or broken-down foot does not have the rigidity to give this action. If coupled with a

The cat foot, which has speed and the added quality of endurance, is found in most breeds.

broken-down pastern, the muscles rather than bone will be forced to carry the dog's weight.

The desirability of thick pads is obvious—they help cushion the impact of each step and protect the bones. In some breeds a hare foot is desirable because of the extra leverage that the longer bones give; it increases speed. The cat foot has speed and the added quality of endurance.

#### THE BACK

In most countries and in most breeds, fads develop. Overly refined heads and extremely short backs are two examples, with the latter being most prevalent today. All fads are bad. A dog should have a short, level back, but within reason. A dog that is higher than it is long is not natural. This will lead to a lack of soundness. The way to measure a dog's length is from the point of the shoulder blade to the point of the buttocks. The height of a dog can be measured from the top of the withers to the ground.

## In most breeds, fads develop which can lead to structurally unsound animals.

Most standards call for a level back. It is unfortunate that many people do not know where the back is located; the general consensus is that it starts at the withers and extends to the base of the tail. In reality, this is the topline. The back is a very short section of the topline that starts approximately at the last rib and extends forward for about five ribs.

#### THE CROUP

The croup is the portion of the spinal column from the last vertebra of the loin to the first of the tail. Croups usually are defined in one of two ways: either flat or steep. Both have distinct advantages for particular breeds. When a flat croup is called for, it is not a truly flat croup that is desired but rather one of about 30 degrees. The standards in most breeds call for this configuration. It should be mentioned that slope of the croup is really just an indication of the pelvis set—its attachment to the spinal column.

The reasons for wanting a 30-degree croup or pelvis set are twofold (Figure 13). First, it permits the rear leg to swing backward much more than does a steep croup. Understanding that the major portion of the dog's power is derived from the leg

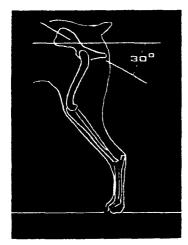


Figure 13

during its backward sweep makes it easier to see why a long back stroke is desirable. Second, a flat croup permits longer muscles from it to the stifle. These are also part of the group of muscles that add power to the drive.

#### THE PHASES OF MOVEMENT

Each leg, front and rear, goes through four phases with approximately the same results for both the front and rear (Figure 14). Phase 1 starts at the point where the leg first touches the ground at its most forward position and continues to a point directly under the shoulder or hip. During this phase, particularly with the front, the leg is to the dog what a pole is to a pole-vaulter. It propels the dog into an arc. (Remember that the legs of a dog do not move under the dog; the dog moves over its legs.) Phase 1 is critical as far as the front is concerned because the center of gravity of the animal passes over it. It has little effect on the rear.

A dog propels itself forward by pushing on the ground with its pad; a dog does not pull itself forward.

Phase 2 starts directly under the shoulder or hip and continues to the point where the foot leaves the ground to resume another step. This is the key phase of movement. A dog propels itself forward by pushing on the ground with its pad; a dog does not pull itself forward. In regard to the hindquarters, it is during this phase that the leg begins and finishes uncoiling like a spring to give drive. To a degree, the front also adds a limited amount of propulsion to the drive.

Phase 3 starts when the leg leaves the ground at its rear extended position and is pulled forward to a position directly under the shoulder or hip. Phase 4 continues this action at this point by pushing the leg forward until it reaches the ground to begin Phase 1 again.

#### SPEED AND ENDURANCE

To get the maximum propulsion, a dog must have good rear angulation-not extreme, but good. This principle does not apply to some of the working dogs that are used to pull loads such as sled dogs. This well-defined angulation enables the legs to compress as a spring and then explode with power. Most of this angulation begins with the upper thigh and pelvis. The two are attached at an angle of about 95 degrees. With a normal croup, this angle is sufficient for good angulation; however, with an extremely flat croup, there is little or no angulation. Most standards call for well-angulated hindquarters. They are a necessity for most running dogs (Pointers, guard dogs, etc.) and for almost any dog that does not do heavy pulling. One of the biggest problems encountered today is overangulation as a result of an observer's ability to see the rear angulation of an animal and not the shoulder angulation.

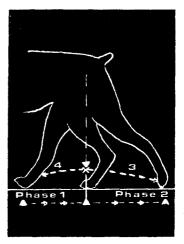


Figure 14

This overangulation can be as bad as too little angulation.

Along with wanting a dog to have adequate speed, we also want endurance. This endurance, or staying power, is determined by the relationship of the hock and lower thigh. Many standards call for "hocks well let down." This statement translates into endurance. A well-let-down hock means that the hock should be relatively short when compared with the lower thigh bones. As the hock lengthens, the lower thigh bones shorten, increasing speed but decreasing staying power. The rear leg of a rabbit is very similar in construction to that of a dog, but the hock is extremely long. Therefore, the rabbit is very fast for a short distance. While a rabbit can easily outrun a Beagle, the Beagle invariably will catch the rabbit after a few minutes' run.

### One of the biggest problems encountered today is overangulation.

#### SUMMARY

In conclusion, when evaluating a dog in the ring, look for the following in the given order:

 Type: Above all, a dog must be true to its breed type and typical of the breed that it represents.
This presentation has given only the basics of

- movement. Each breed has nuances of its own that sometimes make it appear to be different in gait. These are subtleties that must be recognized and taken into account.
- Balance: Everything must be in proportion to the whole—head, neck, topline, front, rear, and tail should look like they belong to the same dog.
- 3. Gait: A dog has three gaits that we usually observe-the walk, the trot, and the gallop. There is, however, one additional gait that also is frequently seen-the pace. The walk and the gallop are "four-time" gaits, meaning that there are four different combinations of legs that may be on the ground at any given time. The trot and the pace are "two-time gaits," which means that there are just two feet on the ground at any time and always the same feet in the same combinations. In the pace, both legs on the same side of the body move parallel to each other, thereby making it a "lazy" type of gait. In the trot, the diagonally-opposite legs move parallel to each other. This is the gait used in the show ring because it is a very simple gait to see and understand. It also attracts attention to any structural faults in conformation.
- 4. Profile Movement: Watch for good front leg extension without a hackney action or pounding. Look for a good rear extension of the hind legs. The hocks should be fully extended at the end of the swing. The rear drive should be energetic and not stilted. Carefully watch the timing between the front and rear legs when they meet under the center of the dog. The front foot

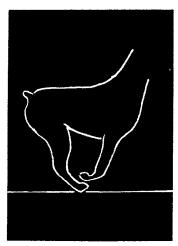


Figure 15

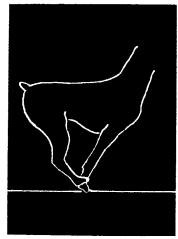


Figure 16

should be off the ground when the rear foot sets itself down (Figure 15). The rear leg or foot should not have to "crab"—pass inside of or outside of the front leg or foot (Figure 16). Watch the withers to see that they do not bounce excessively. They should be nice and smooth in movement.

- 5. Going Away: Look for the legs to converge (Figures 3 and 4) and not to remain under the corners of the body (Figure 1). The amount of convergence does not matter. Make certain that there is a straight line of bone extending from the hip to the pad. If there is a break in this line at the hock, something is wrong (Figure 5). Make sure that you can see the full surface of the pad as the dog moves away. This indicates that the dog is using its full capabilities of drive.
- Coming To You: Similar to the movement of the rear legs. The legs should converge (Figures 6 and 7), and there should be a straight line of

bone from the shoulder to the pad without any break (Figure 8). Do not worry about whether or not the pasterns swing in or out as they return to the front. This does not significantly effect movement.

# Breeders and exhibitors must be objective in evaluating their own animals.

If there is one thing that keeps many breeders and exhibitors from understanding movement, it is kennel blindness—a lack of objectivity in evaluating animals. Don't be guilty of it.

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### HOW TO ADMINISTER MEDICATION TO YOUR DOG

