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## The New Guinea Singing Dog

**Many have forgotten, but you must not forget it. You remain responsible, forever, for what you have tamed. The Little Prince, Antoine de Saint-Exupery.**

### Chapter 1 History of the Singing Dog <3,081>

#### Introduction

The New Guinea Singing dog is a wild dog from the mountains of Papua New Guinea. They have been displayed in zoos since 1956. In North America, a few Singers are now being kept as house pets. However, New Guinea Singing Dogs (Singers) are tamed wild animals and sharing your home with one requires special considerations beyond those needed for domesticated dogs. This book describes Singer history, outlines their behavior and the type of security measures necessary to keep a Singer safely confined, and specifies the care and attention they need to become successful as companion animals.

#### Singer Origin

The origin of Singers is a mystery. They had to be transported to the island by humans, as even at lowest sea levels it was too far between neighboring islands for a small dog to swim, but no one knows where the ancestral Singers came from or exactly when they arrived. We know from the remains of non-native animals on islands of the West Pacific that people were transporting wild animals between the islands 20,000 years ago. The oldest dog fossil in Papua New Guinea (PNG) is a single tooth dated to about 5,500 years ago. A single tooth can not identify the type of dog it came from, although the tooth's size can provide some indication of the dog's size. This tooth was within the size range for Singers, so we know there were Singer-size dogs in PNG at least 5,000 years ago. Dogs could have been present long before that, but they have just not yet been discovered. PNG is situated just below the equator, north of Australia. Scientific archaeological and paleontological work has been sparse in this forbidding island, the second largest island in the world (only Greenland is larger), so there probably are many discoveries still to be made there.

The closest known Singer relative is the dingo of Australia. The oldest securely dated Australian dingo fossil is about 3,500 years old. Because there have never been any dingoes in Tasmania, and that island was connected to Australia by a land bridge until about 12,000 years ago, it is assumed dingoes arrived somewhere within that time span. Recent DNA studies have shown that Singers and dingoes are very closely related. They are more closely related to each other than either is to the Pacific Asian domestic dogs. It is not known which, the dingo or the Singer, was ancestral to the other, or if they were separately founded from the same ancestral population.

There was a land bridge between New Guinea and Australia until about 6,000 years ago. The dingo could have originated as a Singer and became larger and longer-legged in Australia as an adaptation to hunting larger prey in more open places. But it is also possible that the Singer originated as a larger dingo and adapted to the thick forests and steep mountains of New Guinea by becoming smaller and shorter legged. Dr. Susan Bulmer, an archaeozoologist who has worked extensively in New Guinea, has stated she believes that either the dingo and the Singer arrived at the same time from the same source some 10 – 20,000 years ago, or that the ancestral canid arrived first in New Guinea and then expanded into Australia.

In any case, today the two dog species can be completely separated by size and skull shape. Singers average 20 – 30 pounds while Australian dingoes average 30 – 40 pounds, and Singer skulls are much broader across the cheeks in relation to skull length than dingo skulls. The dingoes of Thailand are

smaller than the Australian dingoes, and the Thai mountain dingoes appear to be the closest in appearance to the Singers. Future DNA studies may show that the Thai dingo is also very closely related to Singers.

#### Singer Natural Environment

In order to truly understand Singers, you must know something of their native environment. They are what they are today because of thousands of years of natural selection that has adapted them to the conditions in the Highlands of PNG. The coastal areas of PNG have thick tropical jungles, extensive swamps and meandering rivers. Even today there are no roads into the Western Highlands and only one road from the East Coast to the interior, because the escarpments guarding the interior are too steep. Access is in general by climbing, plane or helicopter. The interior of the island is dominated by a massive mountain range containing the tallest mountains between the Andes and the Alps. Papua New Guinea even has permanent glaciers left over from the last Ice Age, although they are slowly disappearing.

PNG's indigenous people have occupied the Highland interior valley floors for about 40,000 years. Until the 1940's, few foreigners ventured into the Highlands. When they did, they found a large population of people still living with Stone Age technology, unaware of the outside world, growing yams and other crops in the valleys. Until very recently, there was constant warfare between tribes. The fierceness of the tribal people is another reason PNG was little explored until recently.

Because it is situated near the equator, PNG does not have seasons separated by average temperature. Instead, it has "wet" and "dry" seasons and the average temperature depends upon altitude. The lower elevations of the mountains are covered with thick forests of evergreen trees. Rainfall can be as high as 200 inches a year. The mountains rise steeply, so that the tops of the ridges may be only a few yards wide falling away precipitously on either side. Above the lower elevation warm rain forests there are chilly mossy cloud forests. In these forests the ground and the trees up to several feet off of the ground are covered in thick, slippery moss, and clouds hug the mountainsides like fog, making everything moist. Above the cloud forest is a colder sub-Alpine ecosystem with strange pre-historic looking "trees" and dwarfed vegetation. The highest peaks have alpine grassland habitats. Singers live mostly in the cloud forests and higher, from about 4,500 up to about 10,000 feet in elevation. The only other wild species of the genus *Canis* (which includes dogs, wolves, jackals, coyotes, dingoes and Singers) that naturally lives at that high altitude is the Ethiopian wolf.

[New Guinea has several unique animal species. It is famous for its varieties of beautiful Birds of Paradise, tree kangaroos and cuscus. There are small ground-dwelling kangaroos and wallabies but no kangaroos as large as the big Red and Gray kangaroos of the Australian plains. Since the extinction some 5,000 years ago of the PNG Tasmanian wolf, a 140-pound marsupial predator with exceptionally long jaws, Singers have been the only large predators in PNG. The other predators of note are the lowland crocodiles and pythons, and the huge Harpy eagles that range over the entire island. In the lowlands there are also several species of poisonous snakes.]

#### In the Wild

Almost nothing is known about the wild Singers. The Highland terrain is so difficult to navigate, and the interest in studying what most scientists have thought was "just a feral domestic dog" so low, that until recently no one has wanted to go to the trouble and expense to study wild Singers. We do know from anecdotal reports by local natives that Singers have disappeared from areas where they were formerly known. The natives often say something like: "Yes, a long time ago we used to hear the wild dogs singing on the mountain but we have not heard them for many years." As late as 1976 there were scientific expedition reports of Singers in the Star Mountains, and in 1989 Dr. Tim Flannery took a picture of a black and tan wild Singer at a place called Dokfuma, also in the Star Mountains. There are probably still small remnant purebred populations throughout the island in the most remote mountains.

In 1996 a University of Papua New Guinea student, Mr. Robert Bino, made the only field observations about wild Singer habits that have been published. He did not observe any Singers directly, but used signs such as droppings, paw prints, urine marks, and prey remains to infer the Singer's behaviors. He found that sleeping sites, often in depressions under the large buttress roots of trees or under rock outcroppings, were used infrequently, sometimes with long periods elapsing between uses. Bino hypothesized that the Singers are highly mobile and that they may forage alone, raising the possibility that one singer may use multiple refuges or sleeping sites within its home range. He also provided a list of possible prey species, including several species of rats, cuscus, wallabies, dwarf cassowaries and birds.

The dwarf cassowary is an unlikely prey for the Singers, as although “dwarf” compared to the mainland species, it is a substantial, long-legged flightless bird over twice Singer body weight, and can use its heavy legs and claws to fight fiercely. Although it was known that Singers and cassowaries used the same trails through the forests, it was assumed that the Singers were only sharing space with the cassowaries and hanging about the fruiting trees the cassowaries forage upon, in order to catch small prey attracted to the fruits. However, a native hunter reported that he found a wild Singer carcass that had been ripped open above a hind leg. As cassowaries are known to be more defensive than aggressive, the conclusion is that the Singer attacked the cassowary and was unlucky.

Dr. Tim Flannery is the world authority on the mammals of PNG. He spent 20 years exploring the Highlands and cataloging mammal species, discovering several previously unknown to science. In his book Throwim Way Leg he mentions the Singers, which he considers feral domestic dogs related to the dogs of the islands to the west of PNG. We now know from DNA this is not so, but his published comments about the Singers remain some of the few by non-native authorities. He says that although he frequently heard their howls while in the mountains, he actually glimpsed them only a few times in all those years. He calls them “almost preternaturally canny and shy.”

### Village Singers

In the past, the Highland natives occasionally captured young wild Singer puppies and raised them in their villages to use as hunting dogs. The Singers, with their high prey drive and exceptionally acute senses of hearing and smell were useful for locating game in the dense forest. Like the Australian dingoes raised by Aborigines, some of the village-raised Singers probably returned to the wild at sexual maturity. Others may have stayed and produced puppies in or near the villages. About 3,000 years ago the natives acquired domestic dogs (which closely resemble African Basenjis) and they let their Singers cross breed with them in order to improve the offspring’s hunting ability. However, after the mid 1900’s, the Highlanders started keeping chickens, and unlike the domesticated dogs, the Singers could not be trained to leave the chickens alone. So they quit keeping the Singers. In the last few years numerous European dogs have been taken into the fast developing Highlands. Because many native people consider these imported purebred dogs, or their mixes, status symbols, and because these imported dogs are often larger and easier to train, they have become preferred over the indigenous dogs. As a result, the ancient aboriginal dogs may soon be extinct as a pure type.

In the past, a few PNG tribes, mostly in the lowland areas, ate dog meat, but most did not. In general village dog meat was eaten only at ceremonial feasts, not as a regular protein source. Wild Singers were rarely on the menu because they are so elusive they are almost impossible to hunt. A wild Singer will occasionally get caught in a trap set for cassowaries or pigs. These are killed and eaten by some tribes, while others have a strict taboo against eating the wild dogs.

The way PNG village dogs are treated today gives us an idea of how tamed wild Singers probably lived in the past. Like most people of an equivalent technological stage, the native Highlanders of the recent past had a casual symbiotic relationship to their village pariah dogs. The dogs may have “owners” in name, but they move freely about the villages, into and out of the people’s homes. If allowed the dogs voluntarily follow the people on their wanderings. The dogs are not coerced into “obeying” and, as nothing much is expected of them, they are not disciplined, except for stealing food or chewing important objects. In general, the dogs are not mistreated directly, but often suffer from “benign neglect.” Even today, there is no medical care for dogs (or for most people, until very recently) and they survive on the meager scraps left over from the human meals. The cleverest dogs are the ones who can steal the most scraps, so the most intelligent dogs get a little more to eat and thus in the long run are able to produce more pups. Pariah dogs must be hardy and adaptable.

The exception to the rule of village dog life are the prized hunting dogs, a function in the past served by tamed Singers. Good hunting dogs receive regular meals and are usually granted their own share of any animal they find for the hunters. These domesticated hunting dogs are not trained to hunt on command. They merely go with the hunter and instinctively search for prey, for themselves. Because their senses are several times as acute as the human’s, the dog can locate hidden prey, and are especially useful for treeing game and locating small animals hidden in crevices or holes. The dogs can also hold at bay larger prey, such as the feral pigs of New Guinea, until the hunter arrives to dispatch it. Exceptional hunting dogs were sometimes given special burials and honors similar to those given humans.

When possible, the villagers also benefited from their commensal dogs by confiscating any prey bitches brought back to pups born near or in the villages. As bitches normally eat the prey and carry it in their stomachs, and only the least agile bitches could not avoid being caught, this occasional supplementation of the villager's diets was insignificant.

#### History of the Captive Population

The first pair Singers came out of the PNG Highlands in 1956. Sir Edward Hallstrom, an official of the Taronga Zoo in Sydney, Australia, had sponsored the search for them, and he donated them to the zoo. Dr. Ellis Troughton examined this pair at the zoo and in 1957 he published a scientific paper declaring the Singer a species separate from domestic dogs and dingoes. He named them *Canis hallstromi* after Sir Edward. Offspring of this original PNG pair were distributed to zoos around the world, including the San Diego Zoological Park in San Diego, California, which received a pair in about 1959. The San Diego Zoo subsequently sent puppies to many zoos in the U.S.A. and Europe. Until 1987, all Singers in the USA were descended only from this original, presumably sibling pair.

To expand the genetic diversity of the USA captive population, in 1987 the Sedgwick County Zoo, Kansas imported a female named Olga, born at the Kiel Institute for the Study of Domestic Animals in Kiel, Germany. Olga's ancestors were among five Singers that were brought back to Germany by a 1976 expedition of the Museum of Ethnography, State Museums, Germany, to the mountains of the western half of the island, known as Irian Jaya. These Singers came from a village population kept by the Eipo tribe. Today all Singers in the USA trace back to Olga on the female line. Olga produced several litters sired by a San Diego Zoo/Taronga line male named Dinkum. Today, some USA Singer pedigrees trace entirely back to this pair in the fourth or fifth generations, as they were the only pair reproducing for several years.

In 1994 Dr. I. Lehr Brisbin, Jr., brought the male Darkie from Canada to his Swamp Fox Sanctuary in New Ellington, South Carolina. Darkie was born in 1981 at the Baiyer River Sanctuary in the PNG Highlands. His sire was a pure Taronga line male and his dam is listed as "wild caught," making her the last wild Singer to be added to the captive population. No other information is available on this female, as the sanctuary was later closed due to a local inter-tribal conflict and all records lost. The other offspring this pair produced did not go on to reproduce, as they all died after the Taronga Zoo transferred them to a living museum in PNG in 1989. In 1989 Darkie and two female Singers were sent from Taronga to Ms. Sheryl Langdon in Canada. One female died and neither reproduced, so Ms. Langdon agreed to send Darkie to Dr. Brisbin. Between the ages of 13 and 17 Darkie sired three litters out of Dr. Brisbin's Scratchley, a Dinkum/Olga daughter.

#### Pet Singers

Until the late 1980's, all Singers were in zoos. Since then, zoos have in general discontinued keeping them, and many placed Singers in the U.S.A. with exotic animal dealers and private parties. Most of these people have failed to keep accurate records of ownership transfers and pedigree information, so their Singers are "undocumented." Some have bred these specimens and today there is a population of undocumented Singers in the U.S.A. that may exceed the documented number, which in 2003 was about 100 specimens. The New Guinea Singing Dog Conservation Society, USA, (NGSDCS) a group dedicated to preserving both the wild and captive Singer populations, has established a registry for these undocumented Singers, so that pedigrees can be built up and breedings planned to preserve what diversity remains in the captive Singer gene pool. No Singers have been successfully kept as companion pets in any country except the USA and Canada.

As of 2003, the world wide breeding stock consists of about 50 documented, pedigreed breeding Singers. Zoos eliminated their Singer exhibits because they assumed that Singers are "merely" feral domestic dogs, and discontinued them to make room for other species they believed the public would be more interested in. The few that still keep Singers have mostly neutered or spayed them. This is a tragic loss to the Singer gene pool. Hopefully, once the new research indicating Singer uniqueness becomes more well known, zoos will become interested in helping to conserve them. The privately owned documented U.S.A. population is slowly expanding thanks to the efforts of several responsible Singer breeders.

## CHAPTER 2. Characteristics of Singing Dogs

### Physical Description <969>

Captive male Singers generally range from 25 to 30 pounds, and are from 16 to 18 inches at the shoulders. Females are 20 – 25 pounds and 14 – 16 inches at the shoulder. Wild Singers would probably weigh less than the well-fed captive specimens.

Singers resemble the Australian dingo, but are about one-third smaller, and have proportionately shorter legs and broader heads. One of the first things people notice about Singers is their physical grace and agility. They have very elastic joints and spine, and therefore move fluidly: more like a cat than a dog. They are adapted to being climbers and jumpers, not long distance trotters or runners. Singers are not as fast on the straight-away as some similar-sized domestic dogs, such as the whippet, which are designed for running on flat surfaces, but they have a double-suspension gallop like the sight hounds and are much better at cornering and running over rough ground.

When they are very relaxed and trust the person, Singer necks can be bent backward in a "u" so the top of the skull almost touches the back, and their front legs can simultaneously be abducted straight out from the sides of the body at 90-degree angles. The only domestic dog that has similar flexibility is the Norwegian Lundehund, which evolved on rocky islands to hunt puffin birds in crevices. Singers can also rotate their front and hind legs more than domestic dogs. This fox-like trait is another adaptation to maneuvering in thick vegetation and climbing steep rocky slopes. Singers can climb trees with heavy bark, or that have branches that are accessible from the ground, but are not as accomplished at this as gray foxes.

Singer eyes are highly reflective. When they are in low light and look toward a brighter light, their eyes glow bright green. All dogs have some green, yellow or red reflectance in their eyes, depending upon the color of their eyes, but the only animals that have the high reflectance seen in Singers are nocturnal animals such as cats. The Singer's extremely reflective eyes are probably the result of two things: a higher concentration of cells in the tapetum (a reflective layer at the back of the eye present in most mammals, but not in humans) and a pupil that opens wider than average to admit more light. These traits would be adaptations for seeing more clearly in low light. The New Guinea locals report seeing Singers most often at dusk, so in the wild they may be most active between dusk and dawn.

The Singer coat has four hair types on the main body. The innermost type is a fine under fur that is very thick during coldest seasons. Next is a layer of dense medium-length hair (0.5 – 1.0 cm). On the back of the neck and body, the third layer is of coarser guard hairs (2.5 – 3.0 cm on the hackles) and the fourth is an outer layer of scattered, protruding over-hairs that can be golden or black. The hairs down the center of the back, shoulders to rump, are usually very stiff.

The reports about wild Singers sighted and museum specimens all state that their coat color is brown, black with tan, or black (perhaps the reporter did not notice the tan from a distance), all with white markings. The three colors known in the captive population are brown, sable (brown with a heavy overlay of dark-tipped guard hairs), or black with tan on muzzle, legs, and vent. Only the brown color variety has been described in detail.

The brown coat can be pale brown (tan), ginger, or russet, always counter-shaded with lighter cream on the belly, the inner surfaces of legs, and the brush on the underside of the tail. The sides of the neck and a zonal strip behind scapula are lighter golden. Black or very dark brown guard hairs are usually lightly scattered throughout the coat and concentrated on the backs of the ears and the upper surface of the tail above white tip. Singers usually have white markings on the underside of the chin, the paws, chest, and tail tip. About one-third also have white on the muzzle, face, and neck. The muzzle is black in young specimens and turns completely gray by seven years of age.

Other than their white markings, newborn Singers are a uniform dark chocolate brown sable with gold flecks and reddish tinges. Their color changes rapidly to light brown by three to four weeks. The coarser adult coat starts emerging at four months.

Singer eye openings are almond shaped and angled upwards from the inner to outer corners. The eye rims are always dark-colored. The irises vary from dark amber to dark brown. The white sclera often shows in inner corner of the eyes, giving the Singer a "mischievous" expression.

Singers should have a complete set of teeth that meet in the front in a scissors or level bite.

The ears are cupped into a tulip petal shape and the inner surface is well furred. When at alert, the ears are held slightly forward of perpendicular, not straight up. Singers can rotate their ears independently, and can lower them forward of the alert position and down slightly on the sides of the head, giving them the

ability to clearly express their moods.

The Singer tail should be long enough to reach the hock, and have a cream color brush on underside with the longest hairs reaching 5.5 – 6.0 cm. When the Singer is relaxed, insecure, or in searching phase of hunting, the tail is usually carried drooping down. When it is displaying confidence, or alert in the presence of possible prey, the tail is carried above the level of the back, in a curve varying from a fish-hook shape to half circle, thus displaying the pale brush.

#### Unique Characteristics

Unlike any other dog, Singers have a small uvula-like structure at the rear of their soft palate. This may have a functional significance in the production of some of their more unusual vocalizations, especially the bird-like "trill" and the cat-like "purr." In the only comparative study of canid blood enzymes that included Singers, they had two enzymes that matched coyote and red fox, not domestic dogs, wolves or dingoes (the rest did match dog and wolf). This shows that either they evolved these differences while in New Guinea, or, as coyotes and foxes are older species than dogs, that they inherited them from an ancestor other than the ancestor of modern dogs.  
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## Chapter 5. Singing Dog Security Requirements <3,179>

Singers are escape artists. Singers are escape artists. Singers are escape artists. The rule in education and public speaking is to say a thing three times to impress it upon the audience. This is the most important message that can be imparted to Singer owners and potential owners: Singers will take every opportunity and work with concentrated determination to escape confinement. If they are bonded to their humans and well treated, they are not interested in "running away," but they have a strong instinctive urge to go exploring and hunting. All of the Singers on record that have escaped came back, except for those that were hit by cars, captured by animal control personnel, or shot for attacking livestock or pet animals. Once loose and aware that it is loose, a Singer will come to a familiar person only for some extremely desirable reward or out of curiosity, not because it is commanded to "come!" The prospect of a bird in the bush or a mouse in the grass is much more interesting than a known human, and the possibility of finding prey can pull a Singer, joyfully oblivious to traffic, for great distances. Singers can also get their whole bodies through any opening wide enough to admit their heads, which for younger animals may be only a little over four inches in width.

#### Reality story

One young Singer was turned loose in an area surrounded by a six-foot tall wrought iron fence. The spaces between the vertical bars were about five inches, just narrow enough to prevent the Singer from sticking his head through. However, as in all handmade fences, not all the spaces were identical. The Singer tested one opening and found he could not easily get his head through. He then trotted up and down the fence a few times. Suddenly he turned and slipped between two bars. The space there was just slightly wider than average, and he had noticed this immediately. He did not pause, test the opening and then proceed through. He just went through. Fortunately, the owner was watching and with a "jolly routine" and the aid of his other dog, he was able to capture the Singer.

#### Doors and Windows

Singer keepers must at all times be cautious entering and exiting doors to the outside when Singers are loose inside. A whole new set of behaviors must be learned to the point of their becoming habitual. Instead of swinging the door wide, stepping through and pushing the door closed casually behind you, you must learn to squeeze through as small an opening as possible. [The routine sequence is this: (1) if inside, look around while approaching the door to locate the Singer: if outside and there is a glass window in the door or next to it, look through; (2) if inside and the Singer is in the room, tell it to "stay back" or "wait" in a firm tone; (3) open the door slightly: if outside, and there is no handy window, look through the crack in the door to see where the Singer is; (4) turn your body sideways, stepping through the smallest possible gap; (5) begin to close the door as the trailing leg passes through, so there is no large gap around the leg; (6) test the door to be certain it is firmly closed.] If you are exiting from indoors, turn your head as you

step through and be sure the Singer is staying back a few feet, not approaching close enough to dart past your leg. Most Singers quickly learn to remain a few feet back when asked to "wait" and then admonished a few times for trying to follow people through doors uninvited. If more than one person is going through the door, they should do so one at a time, the first one holding the door almost closed until the second person is ready to step through. This is the same way those who live in frigid climates conserve heat going through doors to the outside: use the smallest opening possible and slip through sideways. After closing, doors should be tested by pushing or pulling on them to ensure they are tightly latched. If the Singer owner has older children, they must be instructed in the correct way to use outside doors. If the children are too young to follow directions faithfully, latches should be installed above child-reach on all outside doors. If visitors arrive, a loose Singer should be held, picked up or put on leash before the door is opened.

Screen doors without sturdy grills or glass on the lower half are not much of a barrier to a Singer. They can chew or claw a hole in it in seconds. Metal grills with small mesh should be installed on all screen doors. If the latch on the screen door is not sturdy enough to hold the door firmly shut, a second manual latch should be installed.

Singers quickly learn to manipulate the lever-type doorknobs. They must either be replaced with the standard round type or the door must be actually locked or latched to keep the Singer from letting itself out. Even the round knobs are not impossible for Singers to use. There have been reports of Singers using their mouths to turn the knobs and even unlatching and clawing open sliding doors.

Windows are other potential escape routes that many people do not consider. As mentioned for screen doors, window screens are not much of a barrier for Singers. With their exceptional jumping ability and agility, Singers can easily jump up onto windowsills and balance there. If the window is open and the Singer becomes excited by the sight of an animal they can quickly tear the screen to get out. It is safest to leave windows open only a couple of inches, with a "stop" to keep them from opening wider. If they must be open wider, they should have protective grills installed either on the windowsill or the screen frame.

If windows are positioned so that the Singer can look outside and they have a place to sit or lie down, they will spend extended periods of time watching the world go by. This is great environmental enrichment for them. However, Singer keepers who allow their Singer a window view need to place curtains and drapes as far back as possible. Pull down blinds and slat blinds must be completely raised. Otherwise, an excited Singer may claw at them or grab them with their mouth, causing damage.

#### Climbing Barriers

An unmodified six-foot fence is only a minor challenge to Singers. They easily jump up high enough that their heads are about five feet off of the ground and scramble over the fence. There are reported instances of Singers leaping up to grab opossums off of the top of six-foot fences. If there is a tree that has rough bark or limbs next to a fence to use as a ladder, Singers will use it.

All fences where Singers will be left untended must therefore be at least five-foot high and have a barrier at the top. This can be 45-degree, inward angled arms at least 16 inches long made of metal or wood, with mire mesh or fencing attached. Chicken wire is fine enough to have low visibility but strong enough that a Singer clinging momentarily to the fence can not chew through it. An alternative is an electric hot wire system. Consult a feed dealer or fence specialist about the appropriate type for use with smaller animals. The insulators are small and the wire almost invisible. One disadvantage of some hot wires is they go off if the power goes off. However, there are chargers with back-up batteries, or that run on batteries that are recharged on house current. Another problem with hot wires is designing their installation at gates so it is easy to use them.

Another way to prevent climbing escapes is to use chain link or other heavy duty wire fence at least seven feet high, and attach it to posts on the inside of the fence only up to the five foot level. This leaves about two feet of loose wire at the top. This looks like a "regular" fence until a Singer tries to jump up and climb over. Then the fencing will bend inward and the Singer will drop off.

#### Digging Barriers

Singers are very efficient diggers. They can quickly tunnel under a fence and will move even fairly large rocks to do so. A digging barrier must be put on the bottom of any fences where Singers will be left untended. Wire fencing two feet wide can be attached to wooden fence with fence staples and to wire or chain link fence with "pig rings." Pig rings are usually available at livestock supply stores and are open brass rings closed with special pliers. The smallest size holds the fencing tighter. The wire footing can be

recessed a few inches in the ground by digging a shallow trench before attaching the wire to the fence, or just be pegged down with tent stakes on the loose edge and covered with soil. Ground cover and other plants can be planted on top to conceal the footing. If you use a wire dig barrier, be sure to check it a few times a year, as they will rust out.

Some choose to put a cement digging barrier about 18 inches wide around the inside of the fence. This must extend under the fence if it is wire or chain link and right to the fence if it is wooden, and needs to be about two inches thick. A third alternative is to run a hot wire along the bottom of the fence just above the ground.

#### Gates

Whatever barriers to jumping and digging are utilized, the gate areas must be equally secured. It is advisable to have keyed locks such as padlocks, on all gates to the outside, and to have these locked whenever the Singer is loose in the yard. This prevents the casual opening of the gate, or the malicious opening of the gate to let the Singer out.

If possible, the yard should be secured as outlined above (with the exception perhaps of the digging barrier as long as the fence is tight to the ground) as an area for the Singer to run in only when it is being supervised. A separate, smaller Singer-proof pen should be erected for times when the Singer will be left untended. A minimum size for a pen for one or two Singers that get some free running each day and are confined for no more than 12 hours daily (the remainder of the time being in the house or running supervised, etc.) is about 6 foot wide by 12 feet long. The nicest, easiest way to build such a pen is by using chain link panels set on railroad ties. Chain link fabric can then be laid in as a dig barrier, attached to the ties, and gravel added to about three or four inches in depth. If gravel is to be used with regular in-ground chain link, 1 X 12 boards can be installed around the inside of the fence to keep the gravel from being pushed out. If the pen is erected in an area with poor drainage, French drains need to be installed to direct run-off away from the pen.

#### Fencing

Most wire fencing is not sturdy enough to stand up to a Singer determined to be on the other side. They have very powerful jaws and can bend and break even heavy gauge wires. Welded wire fence is the least useful as the welds are easily broken. Wrapped wire fencing with mesh no larger than 2 inches by 2 inches is best used only to line the "dog side" of wooden fences, or as barriers in places the Singer is not likely to be left untended.

Chain link is the best all-around Singer fencing. Pre-made panels, especially those with an extra cross brace in the middle, are ideal for Singer pens. They are usually more securely attached at the ends and bottoms than in-ground chain link fences. Inspect the bottoms of chain link gates and panels to ensure the fabric is rigidly attached to the bottom rails. Pull up and out as hard as possible. If the fabric can be pulled even an inch above the rail for more than a couple of inches distance, it is not secure enough. In that case, add more wire retainers.

Wooden fences in areas where Singers will be left untended should be lined with wire fencing to prevent chewing. In their desire to get out of the boring enclosure and into the exciting rest of the world, they will chew on wooden posts and boards. With their strong jaws it takes only minutes for them to chew a hole in a one-inch thick board or through plywood. Any exposed edges of boards, posts, etc., should be covered with metal. Singers do not like the feel of metal on their teeth. The metal corner beads made for dry wall installation are inexpensive and easy to work with. They can be cut with tin snips or cut by scoring and bending, and attached with screws. Screws are better than nails, as they are harder to pull out and easier to remove or replace.

#### Collars

Singers should never be walked outdoors using only a buckle collar. If a buckle collar is adjusted to be comfortable to wear, the Singer could back out of it. If it is tightened up enough so it will not pass over the head, it will be too tight for comfort. Singers being taken outside of secure fencing should always be wearing a buckle collar with license and nametag, just in case they escape. However, a martingale collar or a slip collar (commonly called "choke collars") should be used with the leash. These collars will tighten around the Singer's neck if they fight the leash in a panic or try to back out of them, and so are the most secure. Slip and martingale collars for walking can be made of chain, round nylon or flat nylon tape. They should be sized to just slip over the Singer's head. A martingale harness, which has a chest piece shaped

like a Y is also secure for walking Singers. A regular dog harness, with a single horizontal front strap, is not suitable, as Singers are flexible enough to twist out of them.

[Flat collars may wear down the Singer's coat around the neck, but that is a minor cosmetic problem. Nylon is the most durable material, and if they get wet they will not fade onto the coat, as some leather collars will. Rolled collars are less likely to break the hair. ] Collars that are worn continuously need to be carefully fitted. They should be tight enough that the Singer can not easily get a foot trapped under them, but loose enough so that if they get caught on something the Singer would be able, with some effort, to get out of them.

#### Leashes

Leashes should be made of flat or round nylon, leather or cotton web. Chain leashes are uncomfortable to the person's hands and heavy for the dog, and are only as strong as their weakest link. The hardware on leashes and collars should be strong and well made, with neat and complete welds, especially on the rings. The most secure type of snap is called a "bull snap". The tongue of a bull snap is designed so that it pushes inward easily to attach but can not open unless the tongue is pushed backward. Bolt snaps are the most commonly used type on leashes. The drawback of bolt snaps is if they have weak springs and are hit just the right way by the collar ring of a dog jumping hard at the end of the leash, they can accidentally open. Check any bolt snaps to be certain they are sturdy and that the tongue fits tightly into its groove.

Before a Singer is taken out on leash in an unfenced area, the equipment should be safety-checked. Look at the snaps and rings, and the stitching on the leash and collar, to be certain they are in good working order. Stitching can be reinforced by hand or by a cobbler or harness maker. Adding rivets can also reinforce stitching. Some leashes, especially leather ones, have only rivets and this is fine as long as the rivets are in good shape.

Regular walking leashes should be about six feet long. This gives the Singer enough length to investigate and jump around but is not so long as to be cumbersome. The extending automatic cord or belt leads are wonderful for casual walking of Singers. They allow from 16 to 26 feet of play room so that the Singer can wander around and investigate a bit, while still under control. Only American or German made extending leashes of quality construction should be used for Singers. Although Singers rarely are over 30 pounds in weight, extending leashes should be designed for at least a 40-pound dog, as Singers are strong for their size. The weakness in the cord type extendable leashes is the rings that connect the snap and the first part of the leash to the cord. These should be checked before each use to ensure they are not bent or opening up. Another rare problem is that the cord can come loose from the reel, especially if the dog forcefully hits the end of the extended leash. It can be re-attached by opening the case. It is best to "brake" the Singer's run before it hits the end of the leash.

#### Permanent Identification

All Singers should have a tattoo or a microchip ID, or both. Tattoos on the inside of the thigh or on the stomach are visible because the hair in those areas is thinner. All animal control agencies and shelters check animals for tattoos. Some shelters also have microchip readers and check each animal with them. Schering Company, which makes the Home Again brand microchip, in partnership with the American Kennel Club, has distributed free readers to many shelters in the USA. The AKC also has a Companion Animal Recovery System, which for a small fee will register any animal that has either a tattoo or chip (of any brand) and that can be contact toll free in the USA to locate owners. The most recent microchip readers can sense any brand of chip, although they might not be able to read the numbers. As Singers, to a casual observer, could be judged to be "just a mixed breed," permanent ID is very important. If the ID is noticed, the personnel will realize that the Singer is not an unwanted stray but a dog whose owner is concerned about its welfare. Also, if the Singer is lost or stolen, the owner can positively identify it.