

Breeding and Blood Lines

by M.J. Taylor

(from an old publication contributed by Frank Rogers)

The aim of any responsible breeder must be improvement of his own stock, the breeding in of good points, the breeding out of bad and the retention of type as laid down by the breed standard, the same type being developed in every puppy in every litter. A "fluke flyer" landing in the lap of an astonished breeder is an exciting phenomenon to all concerned but it can only be of true value to the breed if the blood lines laid down behind the puppy are dominant in the type produced, and laid down intentionally to produce not only one puppy but an identical litter who will throw soundness and quality ahead to improve the breed in generations to come.

A basic knowledge of the laws governing genetics and heredity may seem unnecessary to the new breeder but a bad litter is just as expensive to rear as a good one and the science of heredity is so fascinating that the growing puppies hold the breeder spell bound and force him on into the next generation and the next, long after he had decided to retire from the dog game and take up more leisurely pursuits.

Line breeding was once described as 'something you did yourself but was inbreeding if someone else did it' The two in fact are very different. 'In-breeding' is the close breeding together of related dogs, i.e. father to daughter - and should only be attempted by a knowledgeable breeder, with his own dogs, as he can offset the risks involved by a complete breakdown over preceding generations of all inherited attributes and failings. The type established in this way is not always as lasting in progeny as type deliberately set in four or five preceding generations, which is *line breeding*. With breeding as in all else a little knowledge is a dangerous thing but knowledge can be increased manifold by a complete study of your own dogs, those of other breeders, of breed pedigrees, and a lot of common sense.

The laws governing inheritance and characteristics were first discovered in 1865 by an Augustian Abbot called Gregor Johann Mendel who experimented with plants. He discovered that the first cross, or breeding, showed only one of the characteristics of the parents, he called this characteristic the dominant member., the other, the recessive. After self fertilization he found that the second generation consisted of plants having the dominant characteristic and others having the recessive (this generation came from a chance combination). In every four, on average, three showed the dominant and one the recessive. When the second generation was bred every plant which had shown the recessive bred true, while of those which had exhibited the dominant characteristic only one out of three bred true. This was the discover of heredity in its simplest form but the reasons for it were not known.

Some years later Weismann discovered that the animal and human body consists of billions of individual cells, and that in the centre of each cell is a minute rod which he called a chromosome, the chromosome carrying the characteristics of the parents. The first cell of each fertilization contains one complete set of chromosomes from each parent, male and female. Growth is established by the splitting of these cells into two, two into four, and so on. Each time a cell is split the original male and female chromosomes are handed down exactly as in the first case. The chromosome is the unit of heredity but at the time of this discovery, no one understood the function of the chromosome.

Dr. Morgan took up the work in the 1900's and experimented with flies - insect reproduction being so speedy that it was possible to conclude an experiment on heredity over several generations in a very short time. He discovered that every animal and plant has a characteristic number of chromosomes and that inheritance comes in groups LINKED TOGETHER - these hereditary elements are now called genes. In the original cell of every new organism the male and female genes are opposite each other. A gene controlling pigmentation lies opposite the female gene controlling pigmentation, and so on. It is now known that a part of the male chromosome can be interchanged with the same part of the corresponding female chromosome so that the paternal chromosome contains elements of the maternal and the lineage group is broken. As only the dominant elements will be inherited by the first generation this will not alter the characteristics of this generation but the change will be seen in the second generation when the offspring will inherit features of both grand parents. This is called CROSSING OVER and in any form of controlled line breeding this crossing over is obviously very important and will emphasize the necessity of an exhaustive study of pedigrees before a mating takes place.

Like does not always beget like, characteristics are inherited from // the ancestors and the pedigree of a foundation bitch or stud dog should be founded in the previous generations, not in the foregoing one alone, remembering always the dominant and recessive elements. A bitch or dog dominant in the desired characteristics will prove invaluable to the improvement of the breed, and the breeder who has studied pedigrees of his own and other breeders produce will see the pattern of dominant and recessive genes emerging. In practicing line breeding a knowledge of hereditary faults and the results of breeding one bloodline on another must be understood as line breeding (and in-breeding) intensifies the faults of both parents if an unsound line is involved. As it is necessary to form a breeding plan so many generations in advance the breed standard of any breed should be regarded by responsible breeders as virtually unchangeable.

Recently research has been carried out on 'pedigree patterns' in animals in an effort to establish sex linkage with dominant and recessive elements. In cattle it is often successful to work the pedigree in a circle, the 'Uncle' and 'Aunt' line being the most likely to carry the desired dominant elements. In dog pedigrees the bitch line is

generally carried upwards and backwards through the dog line, i.e. granddaughter to grandfather. If the grandparent and great grandparent lines have been correctly established it is likely that the dominant genes will be carried more heavily by the dog line and re-enforced by the bitch. When outcrossing therefore in the next generation it is usually preferable to outcross a bitch to a line bred dog who hares some common ancestry which is known to be sound and dominant in the required characteristics. It will probably be necessary in a small breed to accept a weak or undesired line in the bitch's pedigree and it is preferable to use a bitch with the weak line on the dam's side - which is more likely to be recessive - and in the following generation to breed a dog from this litter back to the original blood line, the dam's line on the sire's pedigree should in this instance also be recessive.

All breeders know that nature is a fickle jade but if we can understand a little of what lies behind heredity the odds against us are perhaps evened out to fairer proportions. One day all the answers may be known to us, we shall then be able to produce the perfect specimen with boring regularity and the adventure of striving for perfection will be over.