First and foremost, we must always breed to the standard. As the standard is comprised of many areas of the dog, making up what comprises type, this is a most difficult task. The successful breeder improves on their line in each subsequent generation.

An understanding of standards within the sighthound family is invaluable to the novice and experienced breeder alike. Without this knowledge, which creates a knowledge of form and function it is impossible to have consistent success as a breeder.

The strength of the successful breeder is in the understanding of the faults and strengths of the dogs of the past and in their abilities to produce their strengths. Without a strong knowledge of what forms breed type, the breeder cannot be successful. To breed to the standard, consistently producing dogs of quality, with as few faults as possible, one most attempt to understand the gene pool in the bloodline. Basically, one hopes to gain strength from a strongly line bred line and to eliminate or breed away from the faults that occur through this breeding. In following a program of line/in breeding, an astute breeder breeds to strength, which begins to appear with regularity and away from the faults which crop up.

Mrs. Nagle once said to me to breed in for 3 generations and then go out to a tightly line bred line. This helps to bring in new blood while understanding that the tight gene pool that you bred into should be predictable as to faults and strengths. In our discussion, we were not talking about a raw outcross but rather a trip into a line that would have some commonality but not in the immediate past. If one is a student of pedigrees and the dogs therein, then this should be successful. A look at the pedigree of Sulhamstead Mentor gives us an idea of this practice. However, note that Sulhamstead does appear in the Branwen pedigree so this is in fact a line breeding...albeit a distant one. However, the "nick" was successful, as we see from the subsequent generations. While this is the ideal, the old kennel lines no longer exist in their pure state so one cannot breed into a line such as Ambleside or Sulhamstead as those breeders no longer live to continue their work.

Breeding dogs is a creative art. There are few people in any breed of dogs who have a true vision of the standard in their mind and breed consistently toward it. To keep, in the mind's eye, generations of dogs, their faults and strengths, and what the results were in the various breedings, is a most difficult task. However, without this knowledge and body of research, it is impossible to breed good dogs with any consistency. The early breeders in every breed, had a limited number of dogs to use. They had to inbreed to establish and stabilize type.

If phenotype was the only source of information for us as breeders, we would probably have some degree of success, accompanied by many setbacks caused by our lack of knowledge of the gene pool. With a basic knowledge of Mendel's theories, we can also look at what we believe to be the genetic factors of the dogs in question and come up with a more reliable method of breeding dogs.

A study of the dogs and bloodlines in question will help to explain why a recessive buried for generations, suddenly appears in the phenotype. To weed it out, we have to have knowledge of the bloodline that we are considering to know whether we will be linking to it again in the next generation. When we take that into consideration, we recognize how difficult it is to keep a focus

on the dog as a whole. We do not want to fixate on one problem, only to let all of the positives in the breeeding program be ruined. In other words, "do not throw out the baby with the bathwater".

Remember, in Mendelism, parental germ plasms do not blend irrevocably together but lie side by side, complete entities. Easily understood by saying that breeding a dog with a heavy head to a dog with a weak one, will produce both heavy and weak not a combination of both. While a few moderate heads will appear, this will be from the recessives. Certainly this was part of many of the old wives tales. Now we know to breed a dog with a given fault to a dog correct in that area, and from a line correct in that area, and select a dog from the litter correct in that area. Of course, the dog we select may still be carrying the gene for the incorrect head. This is but one of many factors that the breeder must keep in mind as their breeding program progresses.

> To quote from Phillip Onstott's book "*The New Art of Breeding Better Dogs*" published by Howell, "Mendelism proves that the breeder is matching and balancing genes, not merely mating dogs and bitches. It reduces the operation to its smallest factors. Using those gene factors as stones, the breeder builds the mosaic of the new organism.....He must, perforce, select two dogs for mates whose germ plasm he believes to included the genes he chooses to perpetuate. If he wished to introduce genes from another dog, he is compelled to wait for another generation. And yet, utilizing the genes from single pair of dogs, he is considering those genes as derived from all of their line of ancestry. Mendelism throws another spotlight on the significance of the pedigree. The pedigree becomes a guide as to what genes may lurk hidden and unexpressed in these dogs whose genes we are about to unite.
>
> When an attribute not present in either parent appears in the progeny we call it a "throw back" or atavism or reversion, recognizing perhaps that is a "throw back" to some ancestor identified in the pedigree....The genes which determine its expression lay hidden in the parents and, when those genes are brought together in the right combination, the atavistic attribute finds its expression in the progeny....It may be a mere recessive trait which has lurked hidden in hybrid dominance in the parents...Such an attribute may lie buried for fifty generations and finally come to the surface of expression in phenotype. Mendelism shows us how and why. The longer the recessive gene lies buried, the less the likelihood of its appearance.....If both parents are hybrid dominants for the particular set of genes, then there is a three to one chance for the appearance of the trait it is be dominant and a 25-75 chance if it be recessive".

Outcrossing simply produces a new set of problem genes to deal with...rather than working with the known and "taking the best and leaving the rest". Breeding strength to strength will produce strength and we as breeders have to be knowledgable enough to know when to look to another dog, again closely line bred who carries the strength we need and with enough known about it and its breeding program to know that it will form a successful "nick" when combined with our own. We must always look to the consistency by which bloodlines produce for better or for worse. This is the key to establishing a breeding program that continues to improve in each subsequent generation.

The genotype expresses itself very largely in the phenotype, however, there are exceptions to this.

In choosing a dog or bitch for breeding, one is analyzing the quality of the dog itself, the faults and strengths of the pedigree and the ability of the dogs involved to consistently produce good progeny. If one can find a truly prepotent individual, one who produces himself/herself in every breeding, then your have found a dog, who for a given set of genes is pure dominant and will transmit a dominant gene of that pair to every gamete it produces. These are purebred animals in the Mendelian sense of the word "purebred". While a prepotent individual may derive from a prepotent pedigree, a great pedigree may not necessarily produce a prepotent dog. Again, both the pedigree and the dog must be considered.

> Again quoting from Onstott, "However prepotent a dog or bitch may be, its progeny can manifest recessive characters only if the recessive gene be derived from both sides of the house. This is not true, however, of the genes for the desirable dominant traits. They will manifest themselves in whole or in part if a single parent is pure dominant. The individual prepotent for dominant characters will stamp them upon its progeny regardless of the other parent....Purity has to be built up. Being reached, it may not be intensified. But having been established, it requires to be maintained."

While breeding is an art form, the application of whatever scientific knowledge we have acquired, will help us to produce a high percentage of good dogs. The excitement of having a litter and having the knowledge of your bloodlines to the extent that you know almost from the start how you will breed the next generation is thrilling. This plan is not always clear, but when it is, I have found that it is a guarantee for success in the future.

The key to success is to know your standard; know the bloodlines involved; have some general scientific knowledge; have a vision of the breed in your mind's eye. Inbreed when you know it is necessary to try to lock in a strength; line breed, to perpetuate what you have and outcross (in my terms) to a tightly line bred line with at least one common strain to yours. Do this only to gain a characteristic that you need and only when you have a thorough knowledge of the line in question. **These terms are defined differently by many; but it is interesting to look at the definitions from Webster's Dictionary: Inbreeding**; the interbreeding of closely related individuals especially to preserve and fix desirable characters of and to eliminate unfavorable characters from a stock. **Line breeding:** The interbreeding of individuals with a particular line of descent usually to perpetuate desirable characters. **Outcrossing**: A mating of individuals of different strains but usually of the same breed.

At times, what appears to be a line breeding becomes an inbreeding because of the prepotency of the dogs involved. A study of the pedigrees and pictures of my dogs over a period of years will show how true this statement is.

> Again, from Onstott: "An understanding of the manner in which the genes and chromosomes carry the family traits, or drop them, from generation to generation and of genetic probabilities permits one to see why a brother may be so much more closely related to one full sister than to another."
> "Kinship is not always genetically what it seems to be. ..theoretically it is possible that even full brothers may be actually unrelated."

Continued from Onstott: "Degeneracy is purgation of the strain. Inbreeding being it to the surface where it may be skimmed off and got rid of. It is by their expression in the phenotype that they can be eliminated from the stock and its purity fixed. When absolute outcrosses do succeed in producing typical stock, the explanation lies in the phenomenon of heterosis. Heterosis, the hybridization of unrelated strains or varieties, produces great vigor and stamina for a single generation in the burying of undesirable recessive factors in each line under favorable dominates from the other line. The recessives are, however, only buried, not eliminated, and may crop out live and kicking in subsequent generations....The stamina is for the hybrid generation only, not for the strain. Any virtues which many be added to a strain through outcrossing to another strain can be looked upon as inherent in the first strain until they have been purified and fixed within that strain through inbreeding...Outcrossing is for the breeder who is willing to devote generation to the addition to his strain of a virtue which is lacks"

One of Onstott's important statements to me is "Some of the great prepotent dogs have derived from pedigrees which seem to show no close inbreeding; but the inbreeding is there...like gene have met. And when like genes meet in the zygotes, inbreeding results."

This last statement hits home for me as it confirms what I have always believed and known. When we see a nearly identical phenotype appearing 4 or 5 generations down the line from distantly maintained lines, then I know that the prepotency of the original dog or bitch is still intact.

In summary, I would like reference Marca Burns, "The Genetics of the Dog"

Part of the art of breeding lies in the selection of mates which will 'nick' with each other and produce offspring which revert little or not at all towards the average of the breed. Once the tendency or 'drag of the race' is recognized, the breeder judges his success by the range of merit in his puppies rather than by the production of a few brilliant individuals amongst a lot of duds. The importance of the worst puppy of each generation then becomes apparent; if the worst pups produced in the fourth generation of your strain are just as bad and just as numerous as the worst in your first generation, you have made no real progress, even though you may have bred a champion.

"The foregoing recommendation on breeding methods ...can now be briefly summarized in the form of a breeding plan for the foundation of a strain.

1-Decide on a few traits which are regarded as essential and on any faults considered intolerable.
2-Develop a scoring system in which the selected virtues and faults receive marks in accordance with (a) their importance to your purpose or breeding aim (b) Their rarity or otherwise in the breed as a whole.
3-Line breed consistently to the best individual produced until a better one occurs, then line breed to that. The blood of an outstanding dog or bitch can only be conserved by inbreeding

to whilst the animal is living, but close inbreeding should only be resorted to when an animal of very exceptional qualities and with no outstanding faults is available. If inbreeding results in unsatisfactory litters, this does not condems the favoured animal but merely indicates that a less close mating should be made. Wide outcrosses should not re resorted to after the establishment of a strain, but some outside blood should be introduced. e.g. by the use of a dog sired by one of the strain from an unrelated bitch.

It seems appropriate to insert now an outline that I did for my first lecture that I gave 1981.

"Selecting a puppy starts out long before you actually have the puppies in the whelping box or before you set out to buy a puppy.

First, you must know and understand the standard.
Second, be aware of what correct structure and movement actually are. You must understand how structure affects movement.
Third, know your bloodlines in detail. The faults and strengths and what is being produced in these lines. Breed only from truly superior bitches and to the best dog available. By this I mean, a producer of quality. If he has not produced a litter, he must be truly outstanding and from top producing parents. Never breed to a dog on the basis of a show record. Always breed to achieve the ideal.
Fourth, If a fault is produced strongly in either line, don't choose a puppy with that problem. Keep in mind what you are trying to accomplish when you buy or keep a puppy. Select the puppy that evidences what you are looking for. Try to understand basic genetics.
Fifth, Study the dogs at shows. Over a period of time you will know more about what it being produced than most people. This will prove invaluable to you as you develop your own lines. Never choose a puppy or select a dog or bitch from lines that are consistently producing the same faults.
Sixth, If you decide to breed, make a list of all your bitch's strengths and weaknesses, starring those that also appeared in her sire and dam. Make the same list for the studs that you are considering. Now, compare. Remember, in every breed, there are only a few prepotent dogs and bitches....those that can produce better than themselves or at least as good as themselves with regularity and through several generations.

Personally, a look at my own breeding program begun in 1970, shows a combination of line breeding with some inbreeding. My first bitch purchased in 1966 turned out to be a pet, although from good lines. This jolted me into the start of what has become a lifetime of work as I had to decide what lines I would use. My first foundation bitch from Ambleside/Fleetwind lines arrived in 1970 she was Ch. Fleetwind Clidna of Wildisle. In 1970, I purchased a bitch out of a Sulhamstead bitch sired by a Ambleside/Sulhamstead bred dog. This was Ch. Mistimourne Wildisle Mirage. She shared common ancestors with Clidna. From the breeding of Clidna to a little used dog of Ambleside/Sulhamstead lines Ch. Edgecliff Piper of Cu came Ch. Wild Isle Wizard of Id. This dog with common lines to Mirage produced Ch. Wildisle Warlock. Mirage was later bred to Ch. Sulhamsted Fred and Warlock's sister, Warbonnet, to Sulhamstead Mentor. From the Fred/Mirage breeding came Myth and Match and from the Warbonnet/Mentor breeding came Foolish Pleasure and Firefly. Along the way came Ch. Eaglecrag Kate to be bred to Warlock, tracing her line thru great dogs back to Sulhamstead and this produced Fitzarran Yankee of Eaglesgrag and Fitzarran Dauntless and Dudley and later Kelt and Kinsman. In addition, a Warlock grandaughter (line bred-Ch. Lilliput My Lady Lenore) was purchased and bred to her grandfather Warlock and this produced, among others Ch. Wildisle Alpha

Sirius and Int.Ch. Wildisle Alpha Regulus sent to the Hogbergh's in Sweden and himself a prepotent sire of many champions. Obviously a good nick. Firefly, Warbonnet's daughter was then bred to Warlock's son Dauntless who exhibited many aspects of Warlock's phenotype. From this came Ch. Wildisle Hawk who was then bred to Warlock's granddaughter Ch. Wildisle Ariadne who produced the "J" litter which has come down several generations and was bred to frozen semen, in 1995, from Stargazer, Ariadne's brother.

The prepotency of Warlock and his sire Wizard continues to be seen in this breeding program and those of others today. Selective inbreeding and linebreeding has been the key to its durability.

Remember, keep a vision of the ideal in your mind's eye and look to the past to understand the future.

Jill Richards Bregy
Wildisle, reg.
June 1998

Glossary: (Extracted in part from Onstott's "The New Art of Breeding Better Dogs")

Alleles: Alternate forms of the same gene which influence the same developmental process or processes, but in different ways.
Chromosome: Dark-staining bodies which appear during cell division and which carry the heritable factors, the genes. They occur in pairs, one derived from the mother, the other from the father. Members of a pair carry the same allelic genes in identical arrangement.
Germ cell: A cell with a potential to form a zygote, i.e. a functional spermatozoon or ovum.
Heterozygous: Not pure or true breeding for a given factor. Containing two different alleles of the same gene. A heterozygote produces two kinds of germ cells with respect to the gene in question.
Homozygous: Pure or true breeding for a given character. Having the gene for the character in duplicate, a homozygote produces only one kind of germ cell with respect to that gene.
Hybrid: (1) the offspring of two parents of unlike genetic makeup. (2) A heterozygote for one or more genes.
Zygote: The cell and the resultant organism which results from the union of the ovum and spermatozoon.
Genotype: The hereditary makeup of an individual as distinguished from the expression or manifestation of genes.
Phenotype: The appearance and/or performance of an individual, i.e., the outcome of the interaction between its genotype and its environment.