Notes from *Reproduction and Animal Health* by Charles Walters and Gearld Fry

Charles and Gearld are veterinary surgeons with a lifetime of experience of working with cattle. I recommend their book for any practical farmer of livestock to read. Included here are some quotes from their book to give you some insights.

Carey Reams said, "Life is electrical." All life depends on a supply of electrical energy. Cells are batteries that deliver current As if by osmosis this fact delivers a second principle, namely that all life alters its environment for its benefit, thus to live and reproduce.

Fry says that cattle ranchers have been lured into the hybrid vigor syndrome. The big cow that is late in maturing and produces pounds without quality is undoing the cattle industry.

The authors have described linear measuring to help producers choose body type particularly if they want to use grass and have animals that finish at 16 to 20 months.

The glandular system of the bovine is the key to comprehending the selection and reproduction role. It has to function. It is the motor.

A breeding program should focus on cows not bulls. The goal is to breed a cow and have her wean a calf by the time she is 1000 days old. That means she has to be bred by the time she is 14 to 16 months of age. To get that early calf requires the right phenotype and a pelvis capable of delivery. The phenotype is the observable part of genotype.

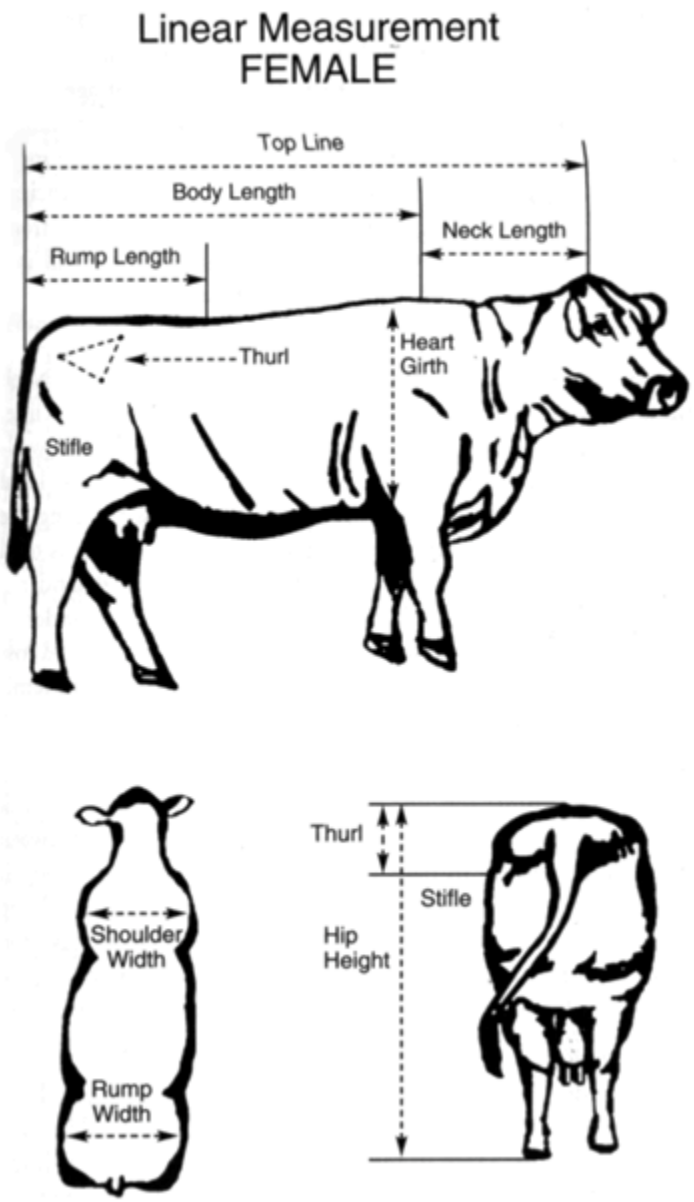
At the point of conception the hypothalamus is determined as is the pituitary. The pituitary controls the adrenal gland. The presentation of the adrenal is indicated by a swirl of hair on the flank. The formation of this swirl will indicate whether the cow/heifer is in calf.

The liver stores nutrition. Basic metal nutrients – copper, zinc, selenium, magnesium, all have to be processed and put in the liver, stored and excreted, governed by a process called homeostasis. Homeostasis is the ability of an animal to maintain internal stability.

The pituitary causes the thyroid to function. If the pituitary is undeveloped then nothing works properly. Late development of the pituitary will mean missed pregnancies, late maturing animals and settling which affects herd profitability. The thyroid patch can be seen on the bottom side of the neck behind the joint. If not observable then it is not functioning properly or the animal is sick. Long hair on the neck indicates a thyroid problem.

Morphology is determined by complete interaction between heredity and environment. Externally affected organs, skeletal size, muscling, fat, hair coat, colour and breed are all characterized by the morphology of the animal. The failure of an animal to shed hair, in the spring, indicates the gland system is not functioning properly. The fault can be genetic or management.

Linear measurement



Heart girth –the growth indicator

A large heart girth gives increased vigor, increases adaptability, and increases feed efficiency and ease of keeping. A large girth creates more space for large heart and lungs, red meat and a large loin, and it also supports reproductive efficiency. A high and extended chine is the best indicator.

Insufficient heart girth is a structural defect that allows front feet to toe out.

Rear Flank –A fertility and maternal trait

The flank of he male should be equal to or 2 inches greater than the heart girth. The difference between heart girth and rear flank is correlated to fertility. A deep flank is a high indicator of milk production, high maternal traits, and will produce maternal daughters. A small difference between girth and flank suggests you should check other

fertility indicators. The flank can vary 2 to 3 inches by fill (water, feed). A high flanked cow represents deficiency of red meat on hindquarters, higher maintenance, more highly-strung and lower in maternal traits.

Rump length in Females –fertility indicator

Rump length significance is the percentage of rump length compared to the two-thirds top line length. Ideal female ratio is 36 to 40% to maintain reproductive efficiency with maximum meat in the rump. A lower rump %, such as 36%, indicates higher fertility.

Importantly there is a direct transfer of rump of female to neck and shoulders of her sons. If the % is over 40% cows become coarse.

Rump length % in males

Rump length in males influences neck length in his daughters. Rump length has to be in balance with masculinity. 38 to 40% is ideal. Less creates loss of red meat and over causes his daughters to be too coarse in the shoulders and a subsequent loss of femininity and maternal traits. There is a direct transfer of shoulder area of the male to his daughters' rump. She will produce masculine sons if this is in the ideal range.

Top Line

The total length of the animal from back of rump to front of poll is the top line (neck length + body length = total top line). The girth of an animal needs to match the top line. Cattle with extra long body lengths are normally high maintenance animals.

Body length should be two thirds of top line.

Female neck length

The neck length should be equal half of the two thirds. The neck back and rump length should each be the same length. If the neck is longer indicates lower feed efficiency, loss of weight while milking, hard doing in cold weather, slowness to breed and late calving.

Male neck length

The neck length of a male should be a minimum of two inches shorter than half the body length. A neck that is greater than this indicates an absence of male hormones and results in late maturing offspring.

The shorter the neck the higher the male hormones and will show in more crest development. The cervical vertebrate has a tendency to curve up, making the neck short. As the neck gets shorter his offspring's rump gets wider resulting in more beef, higher reproductive performance, good libido and higher fertility. A short neck and wide shoulders is an indication of uniform gestation length and uniform birth weights. As the neck gets shorter the female offspring's rump gets wider resulting in early maturity and/or a heavier carcass finishing early.

Male rump width

Rump width should be 44% of rump height. If less there will be an absence of red meat.

Wide rumps are an indicator of early maturity and ease of fleshing.

The wider the rump the larger the rib eye and loin eye area.

The rump and loin of a carcass has 88% of the high value cuts.

The rump area should balance with the neck and shoulders.

Female rump width

The rump width should be 40% of the rump height. Femininity is in the rump of the female (hence the expression female rump).

The wider the rump the greater the reproductive efficiency and the earlier the maturity and ease of fleshing.

The rump width should be at least two and a half inches wider than the rump length and is the highest indicator of fertility and femininity. The wide rump will shorten the neck length of her sons.

A narrow rump cow has an absence of red meat and her sons likely to have structural defects.

Female shoulder width

The shoulders in the female should be the same width as the rump length.

Shoulders that match the rump length represent a very feminine very fertile female that is easy maintenance and easy fleshing. They will have a larger loin area and produce heavier carcasses.

A narrow a shoulder is a structural defect and denotes high maintenance.

Too wide a shoulder causes lack of milk production and is a form of masculinity, lack of reproductive performance and a reduction of red meat in the rump.

Male shoulder width

The shoulders and neck are the most prominent indicators in the male.

Shoulder width should be2 inches wider than the rump length at 12 months of age.

Wider is better and is an indicator of reproductive efficiency creating a higher live sperm count.

Wide shoulders cause early puberty and result in the production of female offspring that calve early, breed back and wean a heavy calf and/or give more milk.

Wide shoulders provide the ability to withstand stress.

A proper bone structure –not meat, condition or fat, but genetics –causes wide shoulders and a short neck.

Yearling bulls with good adjusted shoulder width correlate with uniform gestation length, uniform birth weights, calving ease, and more uniform weaning weights, resulting in more kg of beef or milk.

Narrow shoulders with little or no crest at 12 months, and a feminine look will lose all of the above traits and performance.

The bull controls the birth weight, and it will be within one or 2 kg of his birth weight if he was masculine at 12 months.

Rump height

The rump height is highly correlated to gain ability.

The tall long legged animal will gain over a period of time, will reach puberty late in life, and will be slow to finish, with only a small percentage grading choice.

Height destroys reproduction. Height represents single trait selection. Tall animals, male or female, tend to be out of balance.

Thurl

The thurl and its form determine calving ease of the female.

It also determines the serving ability of the male.

Straight hocks are most undesirable and influence the hindquarter form and efficiency.

The ideal is where there is an 18 degree slope from hip to pin bone and the thurl bone is on a 45 degree angle down from both the hip and pin bone.

Hide and Hair

The hide of a well-balanced bull and cow should be soft and pliable. This kind of hide has more vascular flow under the hide, resulting in shorter thicker hair and better insect repellant. The balanced animal will have a well-developed panniculus muscle and a sensitive pilomotor nervous system that will move at the slightest irritation by insects.

The hair coat accurately reflects the well being of the animal, its hormonal and nutritional balance.

Udder and teats

The scrota and testicular conformations of bulls are responsible for quality of udders on daughters. Evenness of testicles in the bull will give even ovaries in the daughters for regular 3 weekly cycling. The testicles and udder should be directly under the thurl bone for evenness of udders.

Functional efficiency and soundness of the udder, which is a critical factor in the reproductive lifespan of cows is critically dependant on formation features such as pendulousness, size, shape, placement, teat shape, teat opening and pigmentation of udder.

After oestrus cycle starts the udder should have shed all of the long hair, which should not return.

Bulls whose testicle are tipped back, rather than hang straight down, and show a strong suspensory ligament is an indication his daughter udders are less likely to be pendulous.

Testes and Scrotal Sac

The testes in a bull should be 38 to 40 centimeters or larger at 12 months of age. Normally they will not get larger than 44 centimeters when mature.

A mature bull with testes larger than 44 centimeters is normally a later maturing bull. Large testes are easy to bruise.

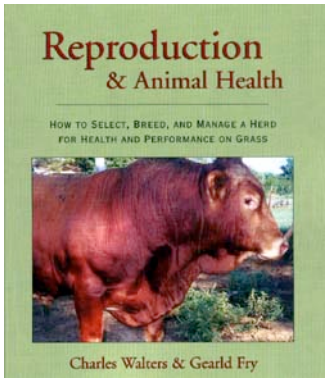
Testes should not hang below the hock joint and if they do are prone to damage with daughter likely to be more pendulous in the udder.

Nipples (teats) should never appear on the scrotal sack neck. Teats on the bull are an indication of teat placement on his daughters.

It is important for the bull's testes to have well a developed epididymis on each testicle, as this is where sperm maturity and storage is concentrated.

Notes of Interest

- A cow should deliver a calf 8% of her body weight
- Heifers will give birth to calves 9% of their body weight
- A cow should wean 55% of her body weight or more
- Calves must have an umbilical cord at birth
- Heifers should be cycling at 10 months of age
- Bulls should have 38 centimeter testes at 12 months
- Bulls should be able to breed and settle 80% of the cows serviced on first serve at 12 months of age and not lose weight
- Bulls that are masculine at 12 months should sire calves the same as their own birth weight
- Heifers should conceive at 14/16 months of age
- A bull or cow that does not shed long hair cannot achieve the highest potential
- Bulls and cows should have pigmented skin and dark hooves
- Hide and hair are indicators of adaptability
- A highly fertile bull will have darker hair on the lower half of the body
- The bull and cows should have a wide mouth and large nostrils
- The cow and bull should have pigment around the eyes
- The cow and bull must have a large gut capacity
- Cows and bulls that can survive on grass, hay and straw and which breed and calve regularly are economically valuable
- Genetics are set in place at conception. The breeder must know his genetics
- When you create a large bovine body the gland system does not get larger
- The ideal cow size is 450 to 500kg
- Selecting for birth weight, milk, height, length, weaning weight. Or any other one trait is considered single trait selection
- Selecting for reproduction and maintenance creates all good and necessary traits
- At the point of conception all things are determined
- The 4 most important areas of a male are shoulder width, neck length, scrotal size and conformation, and heart girth to top line



For more detailed information on Linear measurement refer to "Reproduction and Animal Health: How to Select, Breed and Manage a Herd for Health and Performance on Grass" by Charles Walters and Gearld Fry, 2003.

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