



GLOSSARY

A

abattoir A slaughterhouse.

ablactate To wean.

abomasum The fourth compartment (true stomach) of a ruminant (cow, deer, goat, sheep).

absorption The process of taking in food through the **intestinal wall**.

acanthosis Hypertrophy, or thickening, of the prickle cell layer of skin.

acariosis An infestation of humans or animals with mites or ticks.

Acarina An order that includes mites and ticks.

acclimatization Acclimation, or the complex of processes of becoming accustomed to a new climate or other environmental conditions. A series of compensatory alterations in an animal.

acetate See **acetic acid**.

acetic acid A weak organic acid (CH_3COOH) with a characteristic pungent odor. It is a clear colorless liquid. Vinegar is a dilute, impure acetic acid.

acetone (ketosis) A condition characterized by an abnormally elevated concentration of ketone (acetone) bodies in body tissues and fluids.

achromotrichia Graying of the hair.

acromegaly A chronic disease caused by an overfunction of the anterior pituitary with excessive production of growth hormones. It is characterized by an enlargement of the bones and soft parts of the hands, face, and feet. Also called *Marie's disease*.

acute Generally characterized by a short and often severe course.

adaptation The adjustment of an organism to a new or changing environmental condition.

adaptation syndrome The defensive response of the body through the endocrine system to systemic injury evoked by stresses and worked out by an initial stage of shock.

ADF (acid detergent fiber) Fiber extracted with acidic detergent in a technique employed to help appraise the quality of forages.

ADG See **average daily gain**.

adipose Of a fatty nature; the fat present in cells of connective tissue.

ad libitum (ad lib) At pleasure. Commonly used to express the availability of feed on a **free-choice** basis.

aeration To mix with air. In aquaculture to expose and mix water with air, to increase the amount of oxygen in the water.

aerobic A term usually applied to microorganisms that require oxygen to live and reproduce.

afebrile Without fever.

afterbirth The placenta and allied membranes with which the fetus is connected. It is expelled from the uterus following **parturition**.

agalactia A failure to secrete milk following parturition.

agglutinate To adhere, unite, or combine into a group or mass (as with clumps of certain body cells). The *clumping* is often caused by antibodies attaching to cells and cross-linking them together.

agglutination The clumping together of cells, especially bacteria or red blood corpuscles, distributed in a fluid. In biology, it is generally a result of antigen-antibody reactions. Called also *clumping*.

agglutination titer The highest dilution of a serum that causes clumping together of cells, especially bacteria or red blood corpuscles.

agglutinin Antibody formed against cells (as bacteria), which, when mixed with these cells, causes them to clump together, or **agglutinate**.

agriculture The utilization of biological processes, on farms and ranches, to produce food, fiber, and other products useful to humans.

AI daughters Daughters of a sire that were sired after the bull was placed in artificial-insemination service.

albinism Congenital absence of pigment in the skin, hair, and eyes. See also **true albino**.

algae Chlorophyll-bearing microscopic plants that synthesize food by photosynthesis. Algae are mostly aquatic and lack true stems, roots, or leaves.

allele See **allelomorphs**, **dominance**, and **recessive**.

allelomorphs (alleles) Genes are paired in each animal, and each kind of gene at a particular chromosome location is called an *allele*. They are alternative forms of genes. Alleles are two genes that occupy the same location (locus) on homologous chromosomes and affect the same trait phenotypically but in a different or alternative way. For example, the gene for brown eyes (B) in humans is an allelomorph of the gene for blue eyes (b). See also **multiple alleles**.

allergen Any substance that gives rise to the formation of antibodies and the resultant allergic reaction. Also called an **antigen**.

allergic Hypersensitivity; inflammatory reaction of the immune system, usually directed against a foreign protein. A hypersensitive state acquired through exposure to a particular **allergen**.

allergy A hyperactive state that occurs in some individuals following introduction of antigens into their bodies.

alopecia The loss of hair (baldness).

ambient temperature The prevailing or surrounding temperature.

- amnion** A thin membrane forming a closed sac around the developing embryo. It contains the amniotic fluid in which the embryo is immersed.
- anabolic** Productive, promoting growth or development of tissues.
- anabolism** Any constructive process by which simple substances are converted by living cells into more complex compounds (constructive metabolism).
- anadromous** Fish species that live most of their life in the sea (saltwater) and return to freshwater to reproduce. Species that go upstream to spawn (e.g., salmon and shad).
- anaerobe** A microorganism that normally does not require molecular oxygen to live and reproduce.
- anaerobic** Condition without oxygen, lacking oxygen.
- analogue** A chemical that resembles another in structure or function.
- anaphase** The third stage of mitosis. It is characterized by the separation of centromeres and identical chromatids.
- anaphylactic shock (anaphylaxis)** An **immunological** reaction with increased sensitivity to a normally nontoxic protein or other antigen when injected with it following initial exposure and sensitization. It may cause a severe or even fatal reaction with respiratory failure or cardiovascular collapse.
- anaphylaxis** An acute allergic reaction. See **anaphylactic shock**.
- anemia** A condition in which the blood is deficient in the amount of needed hemoglobin or in the number of red blood corpuscles or in both. It is characterized by paleness of the skin and mucous membranes, loss of energy, and palpitation of the heart (unduly rapid action of the heart, which is felt by the individual).
- anesthesia** Loss of the feeling of pain, touch, cold, or other sensation, produced by ether, chloroform, morphine, and other compounds; by hypnotism; or as the result of hysteria, paralysis, or disease.
- anesthetic** A substance that produces **anesthesia**.
- anesthetized** The state of having lost sensitivity to feeling or pain as the result of having received an anesthetic agent or compound.
- anestrous period** That time when the female is not in estrus; the nonbreeding season.
- aneuploidy** Animals or plants that possess $2n + 1$ or $2n - 1$ number of chromosomes. Also includes two, or more or less than two, extra chromosomes.
- animal protein factor** See **APF**.
- animal suffering** Condition or state of animal that results in pain or emotional distress.
- animal welfare** Political issue or philosophic discussion concerning animal state of being.
- anion** An ion carrying a negative charge of electricity.
- anogenital** Denotes both the anal and the genital regions.
- anomaly** Abnormal state; marked deviation from normal.
- anorexia** Lack or loss of appetite for food.
- anoxia** Lack of oxygen. Unless given oxygen, pilots may develop anoxia (altitude sickness) when flying at high altitudes.
- anterior** Denotes the front or forward part. It means the same as the **ventral** surface of the body in human anatomy.
- antibiotic** A product of a living organism (especially of a bacterium or a fungus) that, when present in low concentrations, destroys or inhibits the growth or action of another microorganism. Penicillin, tetracycline, and streptomycin are antibiotics.
- antibody** A protein substance (modified type of blood-serum globulin) developed or synthesized by the lymphoid tissue of the body in response to an antigenic stimulus. Each antigen elicits production of a specific antibody. In disease defense the animal must have had an encounter with the pathogen (**antigen**) or have received colostrum milk before a specific antibody can be found in its blood.
- antigen** A high-molecular-weight substance (usually protein) that, when foreign to an animal, stimulates the formation of a specific antibody and reacts specifically *in vivo* or *in vitro* with its homologous antibody.
- antimetabolite** A substance bearing a close structural resemblance to one required for normal physiological functioning, and exerting its effect, perhaps, by replacing or interfering with the utilization of the essential metabolite.
- antioxidant** A substance that prevents oxidation of other molecules.
- antiseptic** From the Latin *anti* meaning "against" and *sepsis* meaning "putrefaction." A substance that prevents growth and development of microorganisms either by destroying them (bactericidal action) or inhibiting their growth (bacteriostatic action).
- antiserum** A serum that contains an antibody or antibodies. It gives temporary protection against certain specific infectious diseases.
- antitoxin** Antibody formed against poisonous toxins, such as the bacterial exotoxins, which specifically neutralizes (counteracts) the effects of the toxin. Diphtheria antitoxin, obtained from the blood of horses infected with diphtheria, is injected into persons to make them immune to diphtheria or to treat them if they are already infected.
- APF (animal protein factor)** The original label given to vitamin B₁₂.
- APHIS** Animal and Plant Health Inspection Service (of **USDA**).
- aphrodisia** Sexual excitement, especially if morbid or excessive; e.g., sexual odors released by male insects sexually excite female insects.
- apiarist** A beekeeper.
- apiary** Bee colonies, hives, and other bee equipment assembled in one location.
- apiculture** Beekeeping.
- aplasia** Lack of development of a tissue or organ, or of cellular products from an organ or tissue.
- apocrine** Denotes that type of glandular secretion in which the secretory products become concentrated at the free end of the secreting cell and are cast off, along with the portion of the cell in which they have accumulated, as in the mammary gland.
- apodous** Legless.
- Appaloosa** A breed of horses with dark-brown or black leopard spots on a roan background.
- apparent digestible energy (DE)** The food-intake gross energy minus fecal energy. Also called *apparent absorbed energy*, or *apparent energy of digested food*.
- apterous** Wingless.
- aquaculture** The raising of plants or animals, as fish or shellfish, in or under a sea, a lake, a river, or another body of water; the raising of aquatic organisms under controlled or semicontrolled conditions.
- aquaculturist** A person who engages in aquaculture, in the farming of plants or animals in water.
- arable** Suitable for cultivation; tillable.
- arboreal** Living in or among trees.
- arbovirus** Any one of several groups of small viruses transmitted by arthropods such as mosquitoes and ticks. Yellow fever, dengue, and equine encephalitis are caused by arboviruses.
- arteriosclerosis** A progressive thickening and hardening of the walls of the arteries, often associated with high blood pressure or with chronic disease of the kidneys.

arthropoda (arthropods) The phylum of the animal kingdom that includes insects, spiders, and *Crustacea*; characterized by a coating that serves as an external skeleton and by legs with distinct movable segments or joints.

Artiodactyla Cattle, swine, goats, deer.

asepsis Aseptic condition, methods, or treatment.

aseptic Free from living germs that cause disease, putrefaction, or fermentation.

aseptically See **aseptic**.

asexual Sexless.

assay The determination of the purity of a substance or the amount of any particular constituent of a mixture.

assimilation The process of transforming food into living tissue (constructive metabolism).

asthenia Lack or loss of strength.

atavism Reappearance of a character after a lapse of one or more generations.

ataxia Failure of muscle coordination.

ataxic Uncoordinated body movements; may result from damage to nerve cells or the cerebellum.

atheroma Fatty degeneration of the walls of the arteries.

atherosclerosis A fatty degeneration of the connective tissue of the arterial walls. A form of **arteriosclerosis** characterized by **atheroma**. Lesions within the arteries with plaques containing cholesterol and other lipid materials.

atom A particle of matter indivisible by chemical means. It is the fundamental building block of the chemical elements. The elements, such as iron and sulfur, differ from each other because they contain different kinds of atoms. There are approximately six sextillion (6 followed by 21 zeros, or 6×10^{21}) atoms in an ordinary drop of water. An atom consists of a dense inner core (the nucleus) and a much less dense outer domain of electrons in motion around the nucleus. Atoms are electrically neutral.

atomic number The number of protons in the nucleus of an atom and also its positive charge. (See Appendix E.)

atomic reactor A nuclear reactor.

atomic weight The mass of an atom relative to other atoms; the atomic weight of any element is approximately equal to the total number of protons and neutrons in its nucleus. (See Appendix E.)

atrophic rhinitis A chronic inflammation of the mucous membranes and turbinate bones of the nose. It often results in distortion of the snout in swine. Growth rate is retarded. Secondary bacterial infection and pneumonia are common complications.

atrophy A defect or failure of nutrition or physiological function manifested as a wasting away or diminution in the size of a cell, tissue, organ, or part.

attenuate To make (microorganisms or viruses) less **virulent**.

auditory Of or pertaining to hearing or the organs of hearing.

autogamous Self-fertilizing.

autopsy Examination, including dissection, of a carcass to learn the cause and nature of a disease or cause of death. Also called **postmortem** examination or **necropsy**.

autosomal genes Genes having their loci on chromosomes other than the sex chromosomes.

autosomes All chromosomes except the sex chromosomes.

average daily gain (ADG) Measurement used by scientists to indicate the daily change in body weight when experimental animals are fed test diets.

avian Pertaining to all species of birds, including domestic fowls.

avidin A specific protein component of egg albumen that interacts (combines) with biotin to render it unavailable to an animal, thus producing the syndrome known as egg-white injury. The phenomenon is observed only when rats, for example, consume uncooked egg, because the avidin is denatured by heat and thereby inactivated.

axilla The small hollow beneath the arm or foreleg where it joins the body at the shoulder (armpit).

axon The central core forming the essential conducting part of a nerve fiber. The long extension of a nerve cell that carries impulses away from the body of the **cell**.

B

backcross The crossing of an F_1 hybrid with one of the parental types (breeds). The offspring are referred to as the backcross generation, or backcross progeny.

background count The number of impulses per unit time registered on a counting instrument when no sample is present.

backgrounding Preparing calves for the feedlot by weaning and transitioning to dry feeds. See also **preconditioned**.

bactericidal From the Latin *caedere* meaning "to kill." Capable of destroying bacteria.

bactericidins Antibodies that cause the death of bacteria but not their dissolution or destruction.

bacterin A suspension of killed bacteria (**vaccine**) used to increase disease resistance.

bacteriophage An ultramicroscopic, filterable virus composed of deoxyribonucleic acid (DNA) and a protein coat. Infects particular strains or species of bacteria and usually causes lysis, or explosive dissolution, of the infected bacterium. Bacteriophages multiply at the expense of bacterial cells. They have no enzymes of their own.

bacteriostasis Retardation of the life processes (growth or development) of bacteria without killing them. A *bacteriostatic* substance is a product that retards bacterial growth.

bacteriostatic Inhibiting the growth or multiplication of bacteria.

bag See **udder**.

balanced ration The daily food allowance of livestock or fowl, mixed to include suitable proportions of the nutrients required for normal health, growth, production, reproduction, and **well-being**.

barred A term used to describe striped markings on fowl.

barren (barrenness) Incapable of producing offspring, seed, fruit, or crops.

barrow Young castrated male pig. (See Appendix A.)

basal (diet) A diet common to all groups of experimental animals to which the experimental substance(s) is (are) added.

basal metabolism (BM) The chemical changes that occur in the cells of an animal in the **fasting** and resting state, when it uses just enough energy to maintain vital cellular activity, respiration, and circulation as measured by the basal metabolic rate (**BMR**). Basal conditions include thermoneutral environment, resting, postabsorptive state (digestive processes are quiescent), consciousness, quiescence, and sexual repose. It is determined in humans 14 to 18 h after eating and when at absolute rest. It is measured by means of a calorimeter and is expressed in calories per square meter of body surface.

bastard A term applied to sheep with hair. It is reputed that “hair sheep” result from interbreeding of sheep and goats, but there is no biological verification of this. Instead, it is more probable that “hair sheep” are the result of domestication and selective breeding (e.g., the Barbados Blackbelly breed of hair sheep).

battery A series of pens or cages.

bay Reddish coat color of horses with black points (mane, legs, and tail).

beaver lamb Sheep or lamb skin with short fine wool that has been dressed with the wool on, dyed, and finished by a process giving a weather-resistant straightness and brightness to the wool.

beebread The flower pollen gathered by bees, which is mixed with a little nectar or honey and deposited in the cells of the comb.

beefy (beefiness) A term used to designate the desirable physical conformation of a beef animal as contrasted with a dairy animal, which is lean (not beefy) and more angular.

beekeeping Apiculture.

beget To procreate, like a sire.

benthic Referring to species that feed on the animals and plants that are on the bottom (benthos) of a body of water.

bioassay The use of animals to determine the active power of a compound as compared with the effect of a standard preparation.

bioclimatology The science that studies the effect of physical environment upon living organisms.

biofiltration Systems in **aquaculture** that use bacterial nitrification by *Nitrosomonas* bacteria to convert ammonia to nitrite, then to nitrate using plastic balls or similar material that provide a large amount of surface area. Populations of *Nitrosomonas* bacteria grow on this surface area and when water is moved across these bacteria the ammonia is converted.

biological control The destruction or suppression of undesirable insects, other animals, or plants by the introduction or propagation, encouragement, artificial increase, and dissemination of their natural enemies, which include predaceous and parasitic insects, predatory vertebrates, nematode parasites, bacteria, protozoa, viruses, and parasitic fungi.

biological half-life The time required for a biological system, such as a human or an animal, to eliminate by natural processes half the amount of a substance (such as radioactive material) that has entered it.

biological oxygen demand (BOD) The use of oxygen in the water by natural processes. Some of those processes include the decay of weeds, leaves, feed, or other organic material.

biologicals Medicinal preparations made from living organisms and their products, used for the prevention or detection of disease; they include serums, vaccines, antigens, and antitoxins.

biological value (BV) The percent utilization of protein within the animal body, expressed by the formula

$$\%BV = \frac{N \text{ intake [(fecal } N - \text{ metabolic } N) + (\text{urinary } N - \text{ endogenous } N)]}{N \text{ intake} - (\text{fecal } N - \text{ metabolic } N)} \times 100$$

biological year In egg production, it is the time interval between the first and last egg laid before a hen enters a molt.

bionomics The study of the relations of organisms to their environment; **ecology**.

biopsy The removal and examination (microscopic or chemical) of tissue from a living body.

biotic Pertains to life or living matter; biologicals.

bird egg A very large reproductive cell.

bitch A female dog. (See Appendix A.)

blastema A group of cells that give rise to an organ or structure either during regeneration or in normal embryogenesis.

bleating Making a vocal sound typical of communication between goats or sheep.

bleeder An animal that has **hemophilia**.

blind quarter A quarter of an udder that does not secrete milk or one that has an obstruction in the teat that prevents removal of milk.

bloat A disorder of ruminants usually characterized by an accumulation of gas in the rumen.

bloated Condition where the stomach is distended with gas causing discomfort to the animal and in severe cases resulting in circulatory failure and death.

blocky (blockier-type) Term commonly applied to meat-producing animals and draft horses meaning a deep, wide, and often low-set animal.

bloom A term commonly used to describe the beauty and freshness of a cow in early lactation. A dairy cow in bloom has a smooth hair coat and presents evidence of milking ability (**dairy character**).

BMR Basal metabolism rate. See **basal metabolism**.

boar Sexually mature uncastrated male pig. (See Appendix A.)

BOD See **biological oxygen demand**.

bolus Regurgitated food that has been chewed and is ready to be swallowed. A large pill for dosing animals.

bomb calorimeter An apparatus for measuring the heat of combustion, as of human foods, animal feeds, and fuel.

bone meal (steamed) A mash of ground animal bones that were previously steamed under pressure. It contains 1.5 to 2.5 percent nitrogen, 12 to 15 percent phosphorus, and 20 to 34 percent calcium. It is used as a fertilizer and as feed for farm animals.

bovine Pertaining to the ox or cow.

bran The seed coat of wheat and other cereal grains, which is separated from the flour and used as animal food.

branding Marking or printing with a hot iron, freeze process, caustic soda, or punch. Cattle are branded with markings that identify ownership. Branding, of course, damages the hide.

bray The cry of a donkey.

break joint The exposed surface of the epiphyseal–diaphyseal growth plate in the lower leg (metacarpus) of a lamb carcass.

breed Animals having a common origin and characteristics that distinguish them from other groups within the same species.

breed average The average milk production of cows for a given dairy breed. (Usually computations are based on **DHIA** records of the past 5 years.)

breed-average herdmates Daughters of a sire in the same herd producing at the current average production for that particular dairy breed. See **herdmates**.

breeding value (genetic value) The genetic ability of an animal to secrete milk, lay eggs, grow meat/wool, or contribute to other products or services of benefit to humans. One-half of this genetic ability is transmitted to sons or daughters; hence the term *breeding value*.

breed out To eliminate undesirable characteristics through selective matings.

breed true To have the ability to transmit a characteristic uniformly to offspring.

breed type A particular type or form characterizing a breed. It includes special breed features in head, ear, color, or other traits common to a particular breed.

British breeds Those breeds, such as Hereford, Angus, and Shorthorn, native to Great Britain.

broad-spectrum antibiotic An antibiotic that is active against a large number of microbial species.

broilers (fryers) Chickens (meat type) that are 6 to 12 weeks of age.

bronco (bronc) Any wild or untamed western horse. A wild mustang that has not been broken (trained).

brood A group of baby chickens.

brood animal An animal reserved for breeding and raising young.

brooder An enclosed building, or area within a building, that provides an artificially heated environment for young poultry.

broodfish Adult fish used to produce sperm or eggs, similar to seed stock in livestock production.

broodiness (brooding) Desire of birds to set in a nest on eggs for the purpose of **hatching**. Maternal behavior for hatching and rearing young.

broodmare A female horse used for producing offspring.

buck A male sheep (ram), goat, rabbit, deer, or antelope.

buckskin General term applied to leather from deer and elk skins; used for shoes and gloves and, to some extent, in clothing. Most buckskin is oil-dressed, which produces a soft, pliable leather having a buff color and resembling, before finishing, chamois leather. Also refers to coat color in horses. (See Chapter 5.)

buffering Treating an animal with substances that can neutralize both acids and bases.

buffer solution A substance in a solution that makes the degree of acidity (hydrogen-ion concentration) resistant to change when an acid or base is added. See **pH**.

bull A sexually mature uncastrated male. (See Appendix A.)

buller Pertains to young males riding other young males of a group. In feedlot steers this phenomenon is called *buller syndrome*. See **rider**.

bulling A cow in **heat (estrus)**.

bullock A castrated bull. English term for a finished, or fat, steer. Refers to young bulls destined for slaughter market but fed and managed as steers.

bull studs The organizations that manage bulls to produce semen for commercial sale.

burro A donkey; an ass.

buttermilk Thick, smooth liquid. Usually made from skim milk, using bacteria to produce acid and flavor; contains at least 8.25 percent nonfat milk solids.

C

cadaver The body after death.

calciferol Commonly known as vitamin D₂.

calcify (calcification) To deposit or secrete calcium salts that harden. An injured cartilage sometimes calcifies. The process by which organic tissue becomes hardened by a deposit of calcium salts.

calf (pl. calves) The sexually immature young of certain large mammals.

calf crop Calves produced by a herd of cattle in one season.

calorie (cal) A small calorie is the amount of heat required to raise the temperature of 1 g of water from 14.5 to 15.5°C. This is equivalent to 4.185 J.

calorimetry Measurements of the amount of heat absorbed or given out.

candling Illumination of the egg interior by holding the egg before a light. This is possible because of the translucency of the eggshell and the differences in the capacity of other egg constituents to transmit light. Candling ensures the elimination of practically all inedible eggs (e.g., those containing blood spots).

canine Pertaining to the dog family; includes dogs, wolves, jackals, and others.

cannibalism A habit of some fowls of pecking at or eating other fowls. An animal eating another animal of the same species.

cannon bone Either the metacarpal or the metatarsal bone of the horse.

cannula A device used to connect the rumen with the outside environment. The opening leading from the rumen to the outside is called a *fistula*. A metal-, rubber-, or glass-tube cannula may be inserted into a body cavity to allow the escape of fluids or gas. Liquids and other materials may be introduced into the body through a cannula.

cannulated Having had a small tube (**cannula**) inserted into a body cavity or into a duct or vessel to facilitate the movement of fluids or gas. To study various chemical, nutritional, and physiological functions and processes in **ruminant** animals, a cannula is frequently used to connect the rumen with the outside environment.

canter A fast three-beat gait of a horse; an easy gallop. (See Chapter 5.)

capacitation The physiological process that occurs naturally in the female reproductive tract, which gives mammalian spermatozoa the ability to initiate fertilization. In swine, for example, a population of capacitated spermatozoa first becomes available for fertilization 2 to 3 h after natural mating or artificial insemination with fresh semen.

caponettes Male chickens that have had their reproductive organs made useless by the injection of an estrogenic hormone (e.g., stilbestrol). The testes of these animals decrease in size, and the secretion of testosterone is inhibited, which in turn results in a regression of the secondary sex characteristics (comb, wattles, earlobes, mating instinct, and crowing).

capons (caponized) Male birds (usually chickens) that have had their reproductive organs (testes) surgically removed (castrated). Caponized birds lose some of their male sex characteristics (the comb loses its bright red color and shrinks in size, and libido is lost). Capons are raised for meat production.

caprine Pertaining to or derived from a goat.

captive bolt A pistol used as an alternative to the sole ax or knife for stunning while slaughtering cattle. When fired, a plunger or "bolt" in the barrel penetrates the animal's brain.

caput Head.

carbohydrates Materials consisting chemically of carbon, hydrogen, and oxygen. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are so named because the hydrogen and oxygen are usually in the proportion to form water (CH₂O)_n. Formed in plants by photosynthesis, carbohydrates constitute a large part of animal food.

carcass The body of a dead animal. The whole trunk of a slaughtered animal.

carcinogen Any cancer-producing substance.

- cardiac** That which is related to the heart.
- carnivorous (carnivores)** Meat-eating. Carnivorous animals are dogs, cats, bears, weasel-like, and other mammals.
- carrier** A heterozygote for any trait. A disease-carrying animal.
- carriion** Dead or decaying flesh of a human or animal.
- carry** To bear, as a pregnant cow carries a calf.
- cartilage** A firm but pliant type of tissue forming portions of the skeleton of vertebrates. The proportion of cartilage in the skeleton of young animals is greater than in mature animals. Also called **gristle**.
- casein** The major protein of milk.
- castrate (castration)** To remove the testicles or ovaries; also called *neutering*.
- catabolic** Destructive.
- catabolism** Any destructive process by which complex substances are converted by living cells into simpler compounds (destructive metabolism).
- catabolize** To break down a complex substance into simpler compounds.
- catalyst** A substance that alters the speed of a chemical reaction without becoming a part of the end product. Enzymes are catalysts.
- catgut** Tough cord obtained from the intestines of cattle and sheep and used for strings of musical instruments, tennis rackets, and stitching in surgery.
- cathartic** A compound (medicine) that quickens and increases evacuation from the bowels. A laxative.
- cation** An ion carrying a positive charge of electricity. Cations include the metals and hydrogen.
- cattalo (catalo)** A hardy crossbreed of the American bison and domestic cattle.
- cattle** Collectively refers to mature bovine animals. In biblical times it referred to all livestock.
- caudal** Denotes a position toward the tail (rump) or posterior end (same as *inferior* in human anatomy).
- cayuse** Native American pony, named after the Cayuse, who currently live in Oregon.
- cecum (caecum)** The first part of the large intestine; forms a dilated pouch, also called *blindgut*.
- cell** A bit of protoplasm that usually contains a nucleus and cytoplasm. Cells are the building blocks of which the body is made. An unfertilized hen's egg is a single cell.
- cellulose** The principal carbohydrate constituent of plant cell membranes. It is made available to ruminants through the action of microorganisms that inhabit the rumen (rumen bacterial flora).
- Celsius** A centigrade temperature scale. Can be converted into Fahrenheit by using the formula $(^{\circ}\text{C} \times 9/5) + 32 = ^{\circ}\text{F}$, or use $(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$. (See Appendix B.)
- centaur** A legendary monster of the Greeks with a horse's lower body and a man's head, arms, and chest.
- centriole** A cell organ usually present as two small chromatic granules in the cytoplasm closely opposed to the nuclear wall. The mitotic center in many cells. It plays a role in cellular division.
- centromere** The point on the chromosome at which identical chromatids are joined and by which the chromosome is attached to a spindle fiber.
- cercaria** The final free-swimming larval stage of a trematode, consisting of a body and tail.
- cervical** Referring to the neck.
- chamois** In the United States, the term refers to the fresh split of sheepskin tanned solely with oils. In other countries, the term includes any one, or several, oil-tanned suede leathers made from sheep or lambskin, deer-, goat-, or kidskin, mountain antelope or chamois, or cattle-hide splits.
- chelating agent** An organic compound that can bind **cations** (metallic ions) by forming a stable, inert complex that is soluble in water; used in softening hard water, in purifying sewage, and in eliminating high concentrations of undesirable metallic or radioactive elements in blood or tissues.
- chemotherapeutics** Chemicals used to treat disease.
- chemotherapy** The treatment of disease by means of chemicals.
- chevon** Meat of a goat kid.
- chick** A baby chicken.
- chigger** A larva (mite) infesting humans, domestic animals, some birds, snakes, turtles, and rodents. Its bite results in inflamed spots, accompanied by intense itching.
- cholesterol** A white, fat-soluble substance found in animal fats and oils, bile, blood, brain tissue, nervous tissue, the liver, kidneys, and adrenal glands. It is important in metabolism and is a precursor of several hormones.
- chondrogenesis** Formation of cartilage.
- chorion** The outermost membrane that encloses the unborn fetus in mammals.
- chorionic** Of or pertaining to the **chorion**.
- chromatid** A chromosome that appears doubled at the metaphase of cell division, connected at one point by a small beadlike body called the **centromere**.
- chromosomes** Dark-staining rodlike or rounded bodies visible under the microscope in the nucleus of the cell in the metaphase of cell division. Chromosomes occur in pairs in body cells, and the number is constant for a species. Chromosomes carry genes arranged linearly along their length. The backbone of a chromosome is the DNA molecule.
- chronic** Of long duration as opposed to **acute**.
- chyme** A thick liquid of partially digested food. It passes from the stomach into the small intestine.
- cirrhosis** A chronic disease of the liver characterized by a destruction of liver cells and an increase of connective tissue.
- clean (cleaned)** Often used to mean to be free of, as with disease or parasites; also a lay term used by livestock producers to mean a cow, ewe, or other farm mammal has shed her **afterbirth**.
- clear egg** An infertile egg.
- cleft** Split or divided to a certain depth. A cleft palate is a longitudinal opening in the roof of the mouth. A *cleft-footed* animal, also called *cloven-footed*, e.g., the cow or hog, has a divided hoof or foot.
- cleidoic** Closed or locked in, as the egg, which is cut off or isolated from free exchange with the environment by a more or less impervious shell.
- climate** The prevailing weather conditions that affect life.
- clinical** Referring to direct observation.
- cloning** (1) Growing a colony of genetically identical cells or organisms *in vitro*; (2) transplantation of the nucleus of an adult somatic cell into an ovum, which then develops into an embryo genetically identical to the original adult.
- clonorchiasis** Oriental liver fluke disease (especially in China and Japan). The causative parasitic trematodes have two intermediate

- hosts; the first is a molluscan, and the second is some edible fish from which humans become infected.
- close breeding** A form of inbreeding, e.g., the mating of brothers to sisters, sire to daughter, and son to dam.
- closed herd (flock)** A herd (flock) in which no outside blood is introduced (no animals are introduced from outside sources).
- cloven-footed** See **cleft**.
- clutch** The eggs laid by a hen on consecutive days are referred to as a clutch. In domestic birds, the number of eggs laid successively are often referred to as a *cycle of laying* or the *laying rhythm*. The term *clutch* for wild birds refers to the set of eggs laid for one incubation. Some birds lay a single egg (e.g., penguin); others lay two (e.g., pigeon); others may lay 12 to 20 (partridges and most domestic fowls).
- coagulant** A substance that acts on a liquid to coagulate it.
- coat** Hair on the body of an animal.
- cock** A male chicken; rooster. (See Appendix A.)
- cockerel** A male chicken less than a year old.
- cod** The part of the scrotum left after castration.
- coefficient of digestibility** The percentage value of a food nutrient that has been absorbed. For example, if a food contains 10 g of nitrogen and it is found that 9.5 g have been absorbed, the digestibility is 95 percent.
- coenzyme** A substance, usually a vitamin or mineral, that works with an enzyme to perform a certain function.
- coitus** Coition; sexual intercourse between individuals of the opposite sex.
- cold sterilization** The use of a cathode ray or an electron-beam gun in food processing to kill bacteria or insect life. Chemical sterilization of instruments.
- colic** A digestive disturbance causing pains in the abdomen, as in horses.
- colitis** An inflammation of the mucous membrane of the colon.
- collagen** Protein contained in connective tissue, cartilage, and bones. It is the chief protein of raw hides and skins.
- collateral relatives** Those related individuals that are not related as ancestors or descendants.
- color fixative** A substance capable of stabilizing colored compounds.
- colostral** Pertaining to the first milk after birth or **parturition**.
- colostrum** The first milk secreted pre- and postpartum.
- colt** A young horse; foal. Male horse under 4 years of age. (A young female horse is called a **filly**.)
- comb** A piece of red flesh (tissue) on the top of a chicken's head.
- comfort zone** The temperature interval during which no demands are made on the temperature-regulating mechanisms. The temperature at which humans and animals feel most comfortable. Also called **thermoneutral zone**.
- commensal** Living on or within another organism and deriving benefit without injuring or benefiting the other individual. Not parasitic symbiosis.
- commercial** Animals that are not registered within a purebred registry organization; also called **grade** animals. Although commercial animals are often considered to be of unknown ancestry, this may not be true. The producer may have carefully selected males and females for mating (including purebreds) but not have continued registry records.
- compaction** Closely packed feed in the stomach and/or intestines of an animal causing constipation and/or digestive disturbances.
- complement** A complex series of enzymatic proteins found in blood serum. These proteins function in immune-mediated destruction of antigens following antibody binding to the antigens. These proteins are involved in antibody-mediated cell lysis, agglutination, phagocytosis, opsonization, and anaphylaxis.
- complementary genes** Genes that so interact that when both are present a new or novel trait appears.
- complement fixation** A biological reaction that is the basis of many tests for infection. It utilizes a three-phase system: (1) antigen, (2) **complement**, and (3) antibody. When a specific antigen and antibody are mixed in the presence of complement, a reaction occurs that fixes or renders the complement inactive or fixed. Therefore, if the presence of a specific antigen or antibody in a mixture is known, the presence of the other can be determined by the mixture's reaction on the complement. Such a reaction is the basis of many tests for infection, including the Wassermann test for syphilis and reactions for gonococcus infections, glanders, typhoid fever, and tuberculosis.
- complete ration** A blend of all feedstuffs (forages and grains) in one feed. A complete ration fits well into mechanized feeding and the use of computers to formulate least-cost rations (least-cost diets).
- concentrate** A feed high in **NFE** and total digestible nutrients and low (less than 18 percent) in crude fiber. It includes the cereal grains, soybean oil meal, cottonseed meal, and by-products of the milling industry, such as corn gluten and wheat bran. A concentrate may be either poor or rich in protein.
- conception** The fecundation of the ovum. The action of conceiving or becoming pregnant.
- condition** Refers to the amount of flesh (body weight), the quality of hair coat, and the general health of animals.
- conduction** A means of dissipating heat, especially on contact with cool water. The transfer of heat.
- conformation** The physical form or physical traits of an animal; its shape and arrangement of parts.
- congenital** That which is acquired during prenatal life. It exists at or dates from birth.
- constitution** The general strength and bodily vigor of an animal.
- contact insecticide** Any substance that kills insects by contact, in contrast to a stomach (ingestant) poison, which must be ingested.
- contact poison** Chemicals that kill insects following direct absorption through the exoskeleton; the insect must touch the chemical to cause damage to or disturbance of proper body function, or to be killed by it.
- contagious** Transmissible by contact.
- convection** Either cooling or warming of an animal by wind (breezes) according to whether the wind is cooler or warmer than the surface temperature of the animal.
- coprophagy** The ingestion of feces.
- copulation** The act of mating (sexual congress).
- copulatory** (adj. of copulate) The engaging in mating (coitus) among domestic animals.
- cornicle** An abortive spur on a hen's leg that hardens with age. It does not develop into a regular spur, as in the cock.
- corn stover** The dried cornstalk from which the ears have been removed.
- corpora allata** Paired glands of insects that secrete juvenile hormones.
- corral seines** Seines used to capture a portion of the aquatic crop within a production pond.

correlation A measure of how two traits vary together. A correlation of +1.00 means that as one trait increases the other also increases—a perfect *positive* relation. A correlation of -1.00 means that as one trait increases the other decreases—a perfect *negative*, or *inverse*, relation. A correlation of 0.00 means that as one trait increases, the other may increase or decrease—no relation. Thus a correlation coefficient may lie between +1.00 and -1.00.

cosmic rays (cosmic radiation) Radiations of many sorts, but mostly atomic **nuclei** (protons) with very high energies, originating outside the earth's atmosphere.

cosset A lamb raised without the help of its dam.

cotyledon The area of attachment of the fetal placenta to the maternal placenta (carunde) in certain types of ruminants.

cotyledonary type Refers to the type of **chorion** attachment to the uterus; e.g., in the cow and ewe contact is made only at certain points on the uterus (**cotyledons**) rather than over most of its surface area as in the mare and sow.

counter A general designation applied to *radiation-detection instruments* or *survey meters* that detect and measure radiation.

covey A flock of birds; quail, partridge.

cow A mature female bovine. (See Appendix A.)

cowhide The hide of any kind of cow.

cow-hocked A condition of a cow or horse in which the hocks are close together and the fetlocks (just above the hoof) are wide apart.

cranial Of or pertaining to the skull or the anterior (front) or superior end of the body.

crawler A newly hatched insect.

creep feeding A system of feeding young animals prior to weaning. It is designed to exclude mature animals (e.g., by using a narrow or low entrance to the feeder).

cremellos This color in horses includes cream-colored hair, pink skin, and blue eyes.

crest The ridge of an animal's neck.

cribbing A condition in which the horse bites the manger or another object while sucking in air.

crimped Rolled with corrugated rollers. The grain to which this term refers may be tempered or conditioned before crimping and may be cooled afterward.

cropping Practices and patterns associated with the growing of crops for animal and human foods.

crossbred Individual for which the parents are from different breeds.

crossbreeding The mating of animals of different breeds.

crossing See **crossbreeding**.

crossing over Exchange of parts by homologous chromosomes during synapsis of meiosis prior to the formation of sex cells or **gametes**. Thus the homologous chromosomes exchange genes.

crude fiber (CF) That portion of feedstuffs composed of cellulose, hemicellulose, lignin, and other polysaccharides that serve as the structural and protective parts of plants. It is high in forages and low in grains. Poultry and swine are limited in their ability to digest fiber, whereas ruminants (cattle and sheep) can benefit from it through rumen bacterial activity. It is the least digestible part of a feed.

crude protein (CP) The total protein in a feed. In calculating the protein percentage, the feed is first chemically analyzed for its nitrogen content. Because proteins average about 16 percent (1/6.25) nitrogen, the amount of nitrogen in the analysis is multiplied by 6.25 to give the CP percentage.

crural Pertaining to the leg or to a leglike structure.

crutching Shearing the genital and udder area of ewes prior to lambing.

cryotherapy The therapeutic use of cold.

cryptorchid An animal in which the testes have not descended into the scrotum.

cryptorchidism A failure of the mammalian testes to descend into the scrotum.

cuboidal Shaped like a cube.

cud A bolus of regurgitated food (common only to ruminants).

culling (culled) The process of eliminating nonproductive or undesirable animals.

culture The growing of microorganisms (or cells) in a special medium.

customary host One in which a parasite commonly matures and reproduces.

cytokinesis Changes that occur in the cytoplasm of the cell during division and fertilization.

cytologist A specialist in the study of cells, their origin, structure, and functions.

cytology The science relating to cells and their origin, structure, and function.

cytoplasm Protoplasm of a cell outside the nucleus.

D

dairy character The evidence of milking ability. See also **bloom**.

Dairy Herd Improvement Association (DHIA) An organization whose program is operated jointly by the USDA and the colleges of agriculture of the land-grant universities to aid dairy producers in keeping milk production and management records.

Dairy Herd Improvement Registry (DHIR) A modification of the DHIA program to make the records acceptable by the dairy breed associations. An **official production record** program.

dam The female parent.

dapple A circular pattern in an animal's coat color in which the outer portion is darker than the center.

dark chestnut A term used to describe a brownish-black, mahogany, or liver-colored horse.

dark meat The legs and thighs of cooked fowls.

day length The length of daylight in hours during a 24-h period.

DDT A proprietary name of dichloro-diphenyl-trichloro-ethane; a colorless, odorless insecticide that tends to accumulate in ecosystems and has toxic effects on many vertebrates. It is a potent nerve poison for insects (its use was banned in the United States in 1973).

deacon A veal calf that is marketed before it is a week old. Also called *bob*, or *bob veal*.

deadborn Stillborn. Dead at birth.

deamination Removal of the amino group (-NH₂) from an amino acid.

deaminized The form of the product of an amino group from which the amino group (NH₂) has been removed. The product is a carboxylic acid if the affected amino acid contained only a single amino group.

decapitate To behead; to cut off the head.

decarboxylation The removal of carboxyl group (-COOH) from an organic acid.

decortication (decorticate) Removal of the bark, hull, husk, or shell from a plant, seed, or root. Also, removal of portions of the

- cortical substance of a structure or organ, as in the brain, kidney, and lung.
- defecation (defecate)** The evacuation of fecal material from the rectum.
- definitive host (final host)** The animal in which a parasite undergoes its adult and sexual life.
- deglutition** The act of swallowing.
- dehorn** To remove the horns from cattle, sheep, and goats or to treat young animals so horns will not develop.
- dehydrate (dehydration)** To remove most or all moisture from a substance, primarily for the purpose of preservation.
- dehydrogenase** Enzyme that "activates" hydrogen.
- deletion** The absence of a portion of a chromosome, causing genes to be absent or lacking.
- dementia** A general designation for mental deterioration.
- dental pad** The very firm gums in the upper jaw of cattle, sheep, goats, and other ruminants.
- dermatitis** An inflammation of the skin.
- dermatophytosis** Any skin infection caused by a fungus, e.g., ringworm.
- dermatosis** Any skin disease.
- dermis** The layer of skin deep to the epidermis, consisting of a dense bed of vascular connective tissue (also known as the *corium*).
- desiccated** Dried out; exhausted of water or moisture content.
- design criteria** Standards based solely on engineering considerations by which an animal accommodation is designed.
- desquamate** To peel or come off in layers or scales, as the epidermis in certain diseases. The shedding of epithelial cells.
- deutectomy** The removal of the yolk sac from newly hatched chicks.
- dewlap** The pendulous skin fold hanging from the throat, particularly of the ox tribe and certain fowl.
- dextrins** An intermediate product of starch digestion (starch to dextrins to maltose to glucose).
- DHIA** See **Dairy Herd Improvement Association**.
- DHIR** See **Dairy Herd Improvement Registry**.
- diaphysis** The shaft of a long bone.
- dicoumarol (dicoumarin)** A chemical compound found in spoiled sweet clover and lespedeza hays. It is an anticoagulant and can cause internal hemorrhages when eaten by cattle. When used therapeutically the trade name is Dicumarol.
- diestrus (dioestrus)** That portion of a female's cycle between periods of estrus (**heat**).
- diet** The kind and amount of food provided for or consumed by a person or animal.
- differentiation** The process of acquiring individual characteristics, such as occurs in the progressive diversification of cells and tissues of the embryo. The transformation of mother cells into different kinds of daughter cells (brain, kidney, liver). This process is irreversible.
- digestibility** That percentage of food taken into the digestive tract which is absorbed into the body as opposed to that which is evacuated as feces.
- digestible energy (DE)** That portion of the energy in a feed which can be digested or absorbed into the body by an animal.
- digestible protein (DP)** That portion of the protein in a feed which can be digested or absorbed into the body by an animal.
- digestion coefficient (coefficient of digestibility)** The difference between the nutrients consumed and the nutrients excreted expressed as a percentage.
- digitalis** A valuable drug having diuretic properties and which increases the contractility of the heart, made from the dried leaves of the foxglove plant. It is commonly used in the treatment of heart diseases.
- dihybrid** A double heterozygote such as *AaBb*.
- dihybrid cross** A cross involving two pairs of alleles, each of which regulates different characteristics.
- diploid** Refers to chromosomes paired ($2n$) in body cells; i.e., there are two of each kind of chromosome in the nucleus as compared with one of each pair ($1n$) in sex cells. Somatic cells are usually diploid, whereas gametic cells are usually haploid.
- direct calorimetry** Measurement of the amount of heat produced within a small chamber (as in a **bomb calorimeter**, where the heat produced through combustion is absorbed by a known quantity of water in which the container is immersed). A means of determining the caloric value of foods and animal feeds.
- disease** Any deviation from a normal state of health that temporarily impairs vital functions of animals.
- disinfect** To destroy or render inert disease-producing germs (pathogens) and harmful microorganisms and to destroy parasites.
- dislocating** A method of killing poultry in which the fowl's head is pulled and twisted until the neck separates from the skull and the spinal cord is severed.
- dispermic** Refers to an ovum fertilized by two spermatozoa (rather than one).
- disposition** The temperament, or spirit, of an animal.
- dissect** To cut an animal into pieces for examination.
- dissipate (dissipation)** To cause to disappear; to spread in different directions.
- distal** Remote, as opposed to close or **proximal**; away from the main part of the body.
- diuresis** Excessive secretion of urine.
- diurnal variation** The amount of variation in one day.
- dizygotic twins** Twins originating from two separate fertilized eggs. They are no more alike genetically than full brothers and sisters born at different times.
- DNA** Deoxyribonucleic acid.
- dock** To cut off the tail (especially in sheep).
- doddie** A **polled** cow.
- doe** An adult female rabbit, goat, or deer.
- dogie** A motherless calf.
- domestic** Pertaining to domesticated animals; animals living near or about human habitations; relating to, or originating within, one's own country.
- domesticate (domestication)** To bring a wild animal or fowl under control and to improve it through careful selection, mating, and handling so that its products or services become more useful to humans. Domesticated animals breed under the control of humans.
- dominance** Gene action in which one **allele** masks (partially or completely) the effect of another allele. The property of one of a pair of **alleles** or traits that suppresses expression of the other in the **heterozygous** condition.
- dominant** Describes a gene that when paired with its allele covers up the phenotypic expression of that gene. For example, brown eyes (*B*) in humans are dominant to blue eyes (*b*). Thus *BB* and *Bb* individuals have brown eyes whereas *bb* individuals have blue eyes. Dominant genes affect the phenotype when present in either **homozygous** or **heterozygous** condition.

dormancy Depressed metabolism. A state in which organisms are inactive, quiescent, or sleeping.

dorsal Pertaining to the back, or more toward the back portion; opposite to **ventral**. It means the same as **posterior** in human anatomy.

double mating (double cover) The mating of female livestock with a male on successive days of an estrous period to enhance the probability of conception. Also, mating a female to two different males during the same heat period.

draft animal An animal, e.g., a horse, mule, or ox, used to pull heavy loads.

drake An adult male duck.

drape A term applied to a cow or ewe incapable of bearing offspring.

drifting The moving of bees from one hive to another because of loss of direction caused by wind or other circumstances.

drone The male bee hatched from an unfertilized egg. It is larger than the workers, does not gather nectar for honey, and has no sting. It mates with (fertilizes) the queen bee.

drone layer A queen bee that has exhausted her supply of spermatozoa stored after mating so that her eggs produce only drones.

dropping A term commonly used to mean **parturition** (the act or process of giving birth).

drove A collection or mass of animals of one species, as a drove of cattle.

dry (dry period) Nonlactating female. The dry period of cows is the time between lactations (when a female is not secreting milk).

dry ice Solid carbon dioxide that is purified, liquefied, expanded to form snow, and finally pressed into blocks. It is used as a refrigerant, as in the storage of semen.

drylot A relatively small area in which cattle are confined indefinitely as opposed to being allowed to have free access to pasture.

dual-purpose An early production term defining animals that were bred to optimize the output of two products, such as cattle bred for the production of both meat and milk. It is generally agreed that performance is not maximized for either individual trait because of the emphasis placed on two different production selection criteria.

dubbing Removing the tips of the comb in young chickens to reduce heat loss and reduce activities between birds, such as comb pecking, related to social dominance.

duct A canal (tube) that conveys fluids or secretions from a gland.

dung The feces (manure) or excrement of animals and birds.

duplication Process in which a chromosome is attached to parts from its own homologous chromosome and thus has duplicate genes.

dyad A unit of two sister chromatids that are synapsed as a tetrad.

dysfunction Partial abnormality, disturbance, or impairment in the function of an organ or a system.

dysgenesis A defect in breeding so that hybrids cannot mate between themselves but may produce offspring with members of either family of their parents. Such offspring are sterile.

dyspnea Difficult or labored breathing.

dystocia Abnormal or difficult labor (**parturition**) causing difficulty in delivering the fetus and placenta.

E

easy keeper An animal that does well on a minimum of food.

EB See **energy balance**.

eccrine Glands or tissues that secrete a substance without a breakdown of their own cells, e.g., sweat glands. See **exocrine**.

ecology The study of the relation of organisms to their environment, habits, and modes of life; **bionomics**.

ectoblast An embryonic cell layer.

ectoderm The outermost of the three primary germ layers of the embryo; gives rise, e.g., to the skin, hair, and nervous system.

ectoparasites Parasites that inhabit the body surface.

eczema An inflammatory skin disease of humans and animals characterized by redness, itching, loss of hair, and the formation of scales or crusts.

edema The presence of abnormally large amounts of fluid in the intercellular tissue spaces of the body. Swelling.

edematous Accumulations of abnormally large amounts of fluid in the intercellular tissue spaces of the body; affected areas have a "swollen" appearance.

efficacy Effectiveness. For example, the effectiveness of an antibiotic in the therapy of a certain disease.

e.g. From the Latin *exempli gratia*. For example.

egg **Gamete** produced by the female.

eggbeater A horse that places his feet carefully and smoothly.

ejaculation A sudden ejection, or discharge, as of semen from the male.

elastin The yellow proteinaceous connective tissues of the skin that provide structural support for the blood vessels and thermostat mechanism. It is obtained when elastic tissue is boiled in water.

electrolyte Any solution that conducts electricity by means of its ions.

electromagnetic Produced by or pertaining to electromagnetism or an electromagnet.

electromagnetic radiation Radiation consisting of electric and magnetic waves that travel at the speed of light (e.g., light waves, radio waves, gamma rays, X rays).

electromagnetic spectrum (ES) A series of waves of varying length. At one end of the ES are gamma rays, whose waves measure only about one-billionth of an inch; at the other end are radio waves, which may be many miles long. Between these extremes, in order of increasing wavelength, are X rays, ultraviolet light, visible light, infrared light, microwaves, and shorter radio waves. All waves have different characteristics, but all travel at the same speed (186,000 mi/s).

element One of the 105 known chemical substances that cannot be divided into simpler substances by chemical means. A substance the atoms of which all have the same **atomic number**, e.g., hydrogen, lead, and uranium. (See Appendix E.)

emaciation A wasted condition of the body; excessive leanness.

emasculatio Excision of the penis; castration.

embryology The science relating to the formation and development of the embryo.

emissivity (or absorptivity) Ratio of the rate of emission (or absorption) of radiant energy per unit area by the given body to the rate of emission (or absorption) from a blackbody at the same temperature.

encephalitis An inflammation of the brain that results in various central nervous system disorders.

encephalomalacia A condition characterized by softening of the brain. A disease causing lesions of the brain in young poultry, caused by a deficiency of vitamin E in the diet.

- endemic (enzootic)** Pertaining to a disease commonly found with regularity in a particular locality.
- endocrine** Pertaining to glands that produce secretions that pass directly into the blood or lymph instead of into a duct (secreting internally). Hormones are secreted by endocrine glands.
- endogenous** Internally produced in the body, e.g., hormones and enzymes.
- endoparasites** Parasites that inhabit the body tissues or cavities, e.g., the tapeworm.
- endophily** The feeding or resting of insects in houses (inside).
- endotoxins** Toxic substances (such as those causing typhoid) retained inside the bacterial cells until the cells disintegrate.
- energy balance (EB)** The relation of the gross energy consumed to the energy output (energy retention). It is calculated as follows: $EB = GE - FE - UE - GPD - HP$ (energy balance equals gross energy minus fecal energy minus urinary energy minus gaseous products of digestion minus heat production).
- ensilage** A green crop (forage) preserved by fermentation in a silo, pit, or stack, usually in the chopped form. Also called **silage**.
- enteritis** Any inflammatory condition of the **intestinal** linings of animals or humans.
- entozoa** Internal animal parasites, e.g., stomach worms.
- entrails** The inner organs of animals, specifically the intestines.
- envenomization** The injection of a poison into an animal (as by a wasp).
- environment (environmental)** The sum total of all external conditions that affect the life and performance of an animal.
- environmental stimuli** Environmental impingements on an animal that cause the animal to respond homeokinetically.
- enzootic** Occurring endemically among animals, i.e., continuously prevalent among animals in a certain region.
- enzyme** A complex protein produced in living cells that causes changes in other substances within the body without being changed itself. An organic catalyst. Body enzymes are giant molecules.
- epidemic (epizootic)** Rapidly spreading (as a disease) so that many animals or people have it concurrently.
- epidemiology (epidemiological)** The field of science dealing with the relationship among various factors that determine the frequencies and distributions of infectious diseases.
- epiderm** Epidermis (the outer layer of skin or tissue).
- epidermal** Of, relating to, or arising from the epidermis.
- epinephrine** A drug used to arrest hemorrhage and to stimulate heart action. It is a slaughterhouse by-product obtained from the adrenal glands. Also called *adrenaline*.
- epiphysial (epiphyseal)** Pertaining to or of the nature of an **epiphysis**. The end of a long bone that has ossified.
- epiphysis** A portion of bone separated from a long bone by cartilage in early life but later becoming a part of the larger bone. It is at this cartilaginous joint that growth in length of bone occurs. It is also called the *head* of a long bone.
- epistasis** Interaction between genes that are not alleles, causing the appearance of a different phenotype. For example, *BB* causes an animal to be black. However, *I* inhibits pigment production. *BBii* would be black, whereas *BBII* would be white. Epistasis can be due to two or more pairs of alleles on the same pair of homologous chromosomes or to two different pairs of genes on two different homologous chromosomes. Epistatic genes interact so that one pair of genes masks or suppresses the phenotypic expression of another pair of genes.
- epistatic** See **epistasis**. Describes gene action in which the **genotype** at one **locus** affects the expression of the genotype at another locus.
- epistaxis** Bleeding from the nose.
- epizootic** Designating a widely diffused disease of animals, that spreads rapidly and affects many individuals of a kind concurrently in any region, thus corresponding to an epidemic in humans.
- equestrian** One who rides horseback.
- equine** Pertaining to a horse.
- eradication** The total elimination of the etiologic (disease-causing) agent from a region.
- ergosterol** A plant sterol that, when activated by ultraviolet rays, becomes vitamin D₂. Also called *provitamin D₂* and *ergosterin*.
- eructation** The act of belching, or casting up gas from the stomach.
- erythema** A severe redness of the skin associated with local inflammation.
- erythropoiesis** The production of erythrocytes (the red blood cells that transport oxygen). Occurs in the red bone marrow.
- escutcheon** The part of a cow that extends upward just above and back of the udder, where the hair turns upward in contrast to its normal downward direction. Also called the *milk mirror*.
- essential amino acid** An amino acid that cannot be synthesized in the body from other amino acids or substances or that cannot be made in sufficient quantities to meet the body's needs.
- essential fatty acid** A fatty acid that cannot be synthesized in the body or that cannot be made in sufficient quantities to meet the body's needs. Linoleic and linolenic acids are essential for humans.
- estivating** See **estivation**.
- estivation** The adaptation, or modifications, in an animal that enable it to survive a hot, dry summer. Estivation is probably an evolutionary adaptation to periods of water scarcity. It is often called *summer hibernation*.
- estrous cycle (estrous period)** Also called **heat period**. The period of sexual receptivity (**heat**) in female mammals.
- estrus** The recurrent, restricted period of sexual receptivity (**heat**) in female mammals, marked by intense sexual urge.
- estuary** The area around the mouth of the river; the lower portion or wide mouth of a river where the salty tide meets the freshwater current.
- ether extract** The fatty substances of foods or other materials that are soluble in ether. Used in food and feed analyses.
- etiology** The study or theory of the causation of diseases.
- euploid (euploidy)** An organism whose chromosome number is a whole-number multiple of the basic, or haploid, number.
- European breeds** Those, such as Charolais, Simmental, and Limousin, native to Great Britain or continental Europe.
- evaporation (transpiration)** As related to environmental physiology, the loss of moisture (sweating).
- evaporation of water** The conversion of a liquid into a vapor (**evaporation**) is an important means of cooling the body in humans and many farm animals.
- eviscerate** To remove the entrails, lungs, heart, and certain other organs from an animal or fowl when preparing the carcass for human consumption.

- ewe** A female sheep. (See Appendix A.)
- excise** To cut out or off.
- excreta** Waste materials discharged from the bowels.
- excystation** The escape of a cyst; especially, a stage in the life cycle of parasites occurring after the cystic form has been swallowed by the host.
- exfoliate** To remove the surface scale or layer.
- exocrine (eccrine)** Secreting outwardly, into or through a duct.
- exogenous** Externally provided, e.g., vitamins.
- exotoxins** Soluble toxins that diffuse out of living bacteria into the environment (the culture medium of the living host). Toxins secreted by living microorganisms.
- expectoration** The act of coughing up and spitting out materials.
- experiment** From the Latin *experimentum* meaning "proof from experience." It is a procedure used to discover or to demonstrate a fact or general truth.
- exsanguination** The withdrawal of blood, as by bloodsucking insects.
- extirpation** The complete removal or eradication of a part.
- extreme ill-being** Condition or state of an animal experiencing severe illness.
- exudate** An abnormal seeping of fluid through the walls of vessels into adjacent tissue or space, or the body cavity.
- exudative diathesis** Symptom of vitamin-E deficiency in poultry. It is characterized by an accumulation of fluid in subcutaneous fatty tissue.
- exuding serum** An oozing (exuding) of the clear portion of any animal liquid (serum). Leakage of body fluids through damaged tissues.

F

- F₁ generation** The first-filial-generation, or the first-generation progeny, following the **parental**, or P₁, **generation**.
- F₂ generation** The second-filial-generation progeny resulting from the mating of F₁-generation individuals. Produced by an inbreeding of the first filial generation.
- factory farming** Pejorative term referring to a large intensive animal-production system.
- facultative** The ability of a microorganism to live and reproduce under either aerobic or anaerobic conditions.
- fag** Any tick or fly that attacks sheep.
- Fahrenheit** The temperature expressed in degrees, where 32° and 212° are the freezing and boiling temperatures, respectively, of water at sea level. A more universal and scientific graduation of temperature is the centigrade Celsius scale. Fahrenheit is converted into Celsius by using the formula $(^{\circ}\text{F} - 32) 5/9 = ^{\circ}\text{C}$, or $^{\circ}\text{C} = (^{\circ}\text{F} - 32)/1.8$. (See Appendix B.)
- fair-being** Condition or state of an animal experiencing fairness.
- fallout** Airborne particles containing radioactive material that fall to the ground following a nuclear explosion.
- false (pseudo) albino** A solid-white horse with colored eyes.
- false heat** The display of **estrus** by a female animal when she is pregnant.
- family** A related group of animals.
- FAO** Food and Agriculture Organization. A specialized international agency of the United Nations that collects and disseminates information on the production, consumption, and distribution of food throughout the world. It was organized in 1945 and has some 120 member nations; it is headquartered in Rome. (See also Section 1.4.1.)
- farrow** To give birth to a litter of pigs. (See Appendix A.)
- farrowed** See **farrow**.
- farrowing** See **farrow**.
- farrowing units** Housing specifically designed for the **sow** to give birth to her **litter**.
- far side** The right side of a horse.
- fascia** A thin sheet or band of fibrous (connective) tissue covering, supporting, or binding together a muscle, part, or organ.
- fasting** Abstaining from food. Certain types of experiments involve withholding food from the test animal for varying periods of time.
- fat** Adipose tissue; an ester of glycerol with fatty acids.
- favor** To protect; to use carefully, as an animal *favours* a lame leg.
- FCM (4 percent fat-corrected milk)** A means of evaluating milk production records of different animals and breeds on a common basis energywise. The following formula is used: $\text{FCM} = 0.4 \times \text{milk production} + (15 \times \text{lb fat produced})$.
- FDA** Federal Food and Drug Administration.
- FE** See **fecal energy**.
- febrile** Pertaining to a fever, or rise in body temperature.
- fecal** Consisting of **feces**.
- fecal energy (FE)** The food energy lost through the feces.
- feces (faeces)** Excrement discharged from the bowels.
- fecundation** Impregnation or fertilization.
- fecundity** The ability of an individual to produce eggs or sperms regularly.
- feed conversion (feed efficiency)** The units of feed consumed per unit of weight increase. Also, the production (meat, milk, eggs) per unit of feed consumed.
- feeder** A young animal that does not have a high finish (fatness) but shows evidence of ability to add weight economically.
- feedlot** A confined area within which livestock are fed until they reach slaughter weight.
- femininity** Physical appearance resulting from well-developed secondary female sex characteristics.
- femoral** Pertaining to the femur or to the thigh.
- feral** Pertaining to animals in the wild, or untamed, state.
- fertile** In the animal sciences, a term referring to the capability of breeding or reproducing.
- fertility** The ability to reproduce.
- fertilization** The process in which two haploid **gametes** fuse, forming a diploid cell, the **zygote**.
- fetal** Relating to or being a **fetus**.
- fetus** The unborn young of animals (usually vertebrates) that give birth to a living offspring.
- fever** Abnormally high body temperature.
- fibrinogen** A soluble protein present in the blood and body fluids of animals that is essential to the coagulation of blood.
- fibroblasts** Connective tissue cells whose function is one of repair. Also called *fibrocytes* and *desmocytes*. These cells produce fibrous tissues of the body.
- fibrous carbohydrates** Those feed components (e.g., cellulose and hemicellulose) not readily digested by nonruminant animals.
- filamentous** Threadlike, very slender.
- filled milk** Milk from which milk fat has been removed and replaced with other fats or oils.

filly A young female horse. A young mare. (See Appendix A.)

filterable virus A name commonly applied to a **pathogenic** agent capable of passing filters that retain bacteria.

find Lay term meaning *to give birth to young*; e.g., a cow *finds* a calf.

fine wool **Wool** with finer, or smaller, fiber diameter. Term also applied to sheep breeds producing finer wool fibers.

fingerling Young, small fish (1 to 10 in) no longer supported by the yolk sac; used to stock aquaculture grow-out ponds.

finish (finishing, finished) The degree of fatness or the distribution of fat in an animal.

finisher (diets) Refers to livestock being fed, or *finished*, for the slaughter market.

first calf A term commonly used to indicate the first calf born to **bovine** females.

first meiotic division The first of two divisions occurring in reduction cell division and resulting in the production of two cells, each of which is haploid, the chromosomes occurring as paired chromatids joined at the centromere.

fission The splitting of a heavy **nucleus** into two approximately equal parts, accompanied by the release of a relatively large amount of energy and generally one or more neutrons.

fistula See **cannula**.

five-gaited saddle horse A horse trained to use the following gaits: walk, trot, rack, slow gait, and canter.

flaccid Limp; weak; flabby.

flatulence A digestive disturbance in which there is often a painful collection of gas in the stomach or bowels.

flay To remove the skin from a carcass.

fleece The wool from all parts of a sheep.

flesh The muscle and fat covering of an animal. See **condition**.

fleshing Removal of adipose tissue on the flesh side of skins or hides to be used in the leather industry.

flight zone The zone within which certain birds rise, settle, or fly as with a flock of geese.

flock A group of birds or sheep; called *band* in goats. (See Appendix A.)

flora The bacteria in or on an animal. Usually referred to as *bacterial flora*, as in the digestive tract.

fluid milk Milk commonly marketed as fresh liquid milks and creams. It is the most perishable form of milk and commands the highest price per unit volume. Also called **market milk**.

flushing Feeding extra concentrate, or higher-energy feed, prior to and shortly after the time of breeding to increase ovulation rate.

foal Young (usually unweaned) horse or mule of either sex.

foaling Giving birth to a foal (newborn horse).

fodder Coarse food such as cornstalks, for cattle or horses.

fodder units (FU) This is a net-energy system of feed evaluation that is used commonly in Scandinavian countries. Values of feeds are measured and expressed in relation to a reference feed, barley. One kilogram of FU is equivalent to 1650 kcal **NE**.

football leather Leather for covering footballs. Traditionally of pigskin, but today it is generally made of embossed or printed cattlehide leather, and sometimes of sheepskin.

forage Roughage of high feeding value. Grasses and legumes cut at the proper stage of maturity and stored without damage are called *forage*.

forager A *worker* bee that goes out in search of food.

force molted The process of concentrating the molting time for laying hens by reducing light and limiting feed intake. See **molt**.

forceps A plierslike instrument used in medicine and certain research studies for grasping, pulling, and compressing.

forequarters The front two quarters of an animal. Also called *fore udder*.

founder Inflammation of the fleshy laminae within the hoof, from concussion, overfeeding, and many other factors causing an oversupply of blood to this region of the hoof. It causes great pain to the affected animal. Also called *laminitis*.

fowl Any bird, but more commonly refers to the larger ones.

fox trot An easy, short, broken gait of a horse, between a walk and a trot.

free-choice Providing animals free access to diets and thereby allowing them to eat at will.

freemartin Female born twin to a bull calf. (About 9 of 10 are sterile.)

freeze-drying See **lyophilization**.

fresh Designating a cow that has recently given birth to a calf.

Friedman test A test for pregnancy in which a small amount of urine of the tested animal is injected into the bloodstream of a virgin rabbit. Pregnancy is indicated by certain changes in the ovaries of the rabbit.

frog The elastic, horny, middle part of the sole of a horse's hoof.

fry The young of fish still nourished by the yolk sac.

full-feed The term commonly applied to fattening cattle being provided as much feed as they will consume safely without going **off-feed**.

fumigant A liquid or solid substance that forms vapors that destroy pathogens, insects, and rodents.

fungus (pl. fungi) Eukaryotic organism that contains no chlorophyll, flowers, or leaves. It gets its nourishment from dead or living organic matter. Includes molds, rusts, mildews, smuts, mushrooms, and yeast.

fungicide An agent that destroys fungi.

fur Skins of wild animals, commonly covered with short fine hair, which are tanned or dressed for garments.

furrowing The process of cytokinesis in animal cells.

G

gait Any forward movement of a horse, such as walking or galloping.

galactophore A milk duct.

galactophorus Carrying or producing milk; conveying milk.

galactopoesis Concerned in the production of milk.

galactopoietic That which stimulates or increases the secretion of milk.

gamete A male or a female reproductive cell. A sperm or an ovum.

gametogenesis Cell-division process that forms the sex cells.

gamma rays (γ rays) High-energy, short-wavelength **electromagnetic radiation**. Gamma rays are very penetrating and are best stopped or shielded against by dense materials, such as lead. They are similar to X rays but are usually more energetic (their penetrating power is greater) and are of nuclear origin. Gamma rays are emitted by isotopes of such elements as cobalt and cesium as they disintegrate spontaneously.

gander A mature male goose.

gaseous products of digestion (GPD) Include the combustible gases produced in the digestive tract incident to fermentation of the diet. Methane constitutes the major proportion of the combustible gases produced by the ruminant; however, nonruminants also produce methane. Trace amounts of hydrogen, carbon monoxide, acetone, ethane, and hydrogen sulfide are also produced.

gastritis An inflammation of the stomach, especially of the lining or mucous membrane.

gastrointestinal Pertaining to the stomach and intestines.

gastrula An early stage in embryonic development; it follows the blastula stage.

GE See **gross energy**.

geiger counter Instrument that counts pulses produced by radioactivity, consisting of a counting tube with a central wire anode, usually filled with a mixture of argon and organic vapor.

gelatin An organic colloidal substance made from animal bones, skins, or hide fragments. Used in leather finishes to produce a tough film on the leather. Glue is an impure form of gelatin.

gelding A castrated male horse. To geld is to render sterile or to remove the testicles. Horses are usually castrated at about 2 years of age. (See Appendix A.)

gene The smallest unit, or particle, of inheritances—a portion of a DNA molecule. Genes occur in pairs located on chromosomes in the nucleus of every cell.

generation See **F₁ generation** and **F₂ generation**.

generation interval The time from the birth of one generation to the birth of the next. In humans, it is calculated by subtracting the average age of the children from the average age of their parents.

genetic correlation Condition in which two or more quantitative traits are affected by many of the same genes.

genetic value The total value of all the genes of an animal for secreting milk or for some other trait. See **breeding value**.

genital (genitalia) Pertaining to the organs of reproduction.

genome The total genetic composition of an individual or population that is inherited with the chromosomes. A haploid set of chromosomes with their genes.

genotype The actual genetic constitution (makeup) of an individual as determined by its germ plasm. For example, there are two genotypes for brown eyes, *BB* and *Bb*. See **dominant**.

gentle Designating an even-tempered, docile, quiet animal.

germ A small organism, microbe, or bacterium that can cause disease in humans and/or animals. Early embryo; seed.

germ-free Designating an animal that is free of harmful organisms, as germ-free pigs used for experimental purposes.

germicide A substance that kills disease-causing microorganisms (pathogens).

gerontology The scientific study of the phenomena of aging. (See Chapter 12.)

gestation Pregnancy (gravidity). The period from conception to birth of young.

get The offspring of a male animal. A *get-of-sire* refers to a given number (commonly four) of progeny from a male or sire.

ghee A semifluid butter preparation from the milk of a buffalo, cow, sheep, or goat. It is nearly 100 percent milk fat and is used primarily in Asia and Africa.

giblets Any of the internal organs of a fowl used as food, particularly the heart, liver, and gizzard.

gigot A leg of mutton, venison, or veal that is trimmed and ready for consumption.

gilt A young female swine; commonly called gilt until the first litter of pigs is **farrowed**. (See Appendix A.)

girth The circumference of the body of an animal behind the shoulders. Also, a leather or canvas strap that fits under the horse's belly and holds a saddle in place.

giving milk Lactating, or the act of yielding milk by a mammal.

gland An organ that produces a specific secretion to be used in, or eliminated from, the body.

glasser Calf or kipskin taken from animals that are poorly fed and possess coarser-grain hide or skin.

gluconeogenesis Formation of glucose from protein or fat.

glycogenesis Conversion of glucose into glycogen.

glycogenolysis Conversion of glycogen into glucose.

glycolysis Conversion of carbohydrate into lactate by a series of catalysts. The breaking down of sugars into simpler compounds.

gnat Any dipterous, biting insect.

gonad The gland of a male or female that produces the reproductive cells; the testicle or ovary.

gosling Any young goose before its sex can be determined. (See Appendix A.)

gossypol A toxic yellow pigment found in cottonseed. Heat and pressure tend to bind it with protein and thereby render it safe for animal consumption. It may cause discoloration of egg yolks during cold storage.

GPD See **gaseous products of digestion**.

grade Non-registered animals showing the predominant characteristics of a given breed. They commonly have at least one **purebred** parent, usually the male.

grading up The continued use of purebred sires on grade dams.

grafting A process of removing a worker bee larva from its cell and placing it in an artificial queen cup, for the purpose of having it reared as a queen. In sheep grafting refers to management practices designed to cause a ewe to accept a lamb transferred from another ewe.

gram-negative bacteria Bacteria that are decolorized by acetone or alcohol and therefore have a pink appearance when counterstained with safranine, e.g., *Escherichia coli*, *Pseudomonas aeruginosa*, *Salmonella*, *Vibrio*, and *Pasteurella*.

gram-positive bacteria Bacteria that are able to retain a crystal-violet dye even when exposed to alcohol or acetone, e.g., staphylococci, streptococci, and *Bacillus anthracis*.

graphite A pure form of carbon.

GRAS An acronym for the phrase *generally recognized as safe*. This term is commonly used by the FDA and others when referring to food and feed additives.

grass tetany A magnesium-deficiency disease of cattle characterized by hyperirritability, muscular spasms of the legs, and convulsions.

gravidity See **gestation**.

gray (Gy) The unit (or level) of energy absorbed by a food from ionizing radiation as it passes through in processing. One gray (Gy) equals 100 rad; 1000 Gy equals 1 kilogray (kGy).

grazing (grazes) Consumption of standing vegetation, as by livestock or wild animals.

green chop (fresh forage) Forages harvested (cut and chopped) in the field and hauled to livestock. This minimizes the loss of moisture, color, nutrients, and wastage. Also called *zero grazing*.

gristle Cartilage.

gross energy (GE) The amount of heat, measured in calories, released when a substance is completely oxidized in a **bomb calorimeter** containing 25 to 30 atm of oxygen (heat of combustion).

grow out To feed cattle so that the animals attain a certain desired amount of growth with little or no fattening.

growthy Designating an animal that is large and well-developed for its age.

grub Also called warble fly. These cause extensive and widespread damage to hides and skins of food-producing animals by puncturing holes along either side of the spinal line (backbone).

gruel A food prepared by mixing a ground feed with hot or cold water.

gut The digestive tract; sometimes referring only to the intestines of animals.

gut tie A condition of animals in which the intestines become twisted, causing an obstruction.

H

habituation The gradual adaptation to a stimulus or to the environment. The extinction of a conditioned reflex by repetition of the conditioned stimulus (also called *negative adaptation*).

hackamore A bridle (with no bits) that controls a horse by pressure on its nose.

hackles Erectile hairs on the backs of certain animals.

half-life The time in which the radioactivity originally associated with an isotope will be reduced by one-half through radioactive decay. The time in which half the atoms of a particular radioactive substance disintegrate into another nuclear form. Measured half-lives vary from millionths of a second to billions of years. *Effective half-life* is the time required for a radionuclide contained in a biological system, such as a person or an animal, to reduce its activity by one-half as a result of radioactive decay and biological elimination.

half sib In genetics, a half brother or half sister.

halogens A group of elements, including fluorine, chlorine, bromine, and iodine, which are strong oxidizing agents and have disinfectant properties.

ham shank The hock end of a ham.

hamstring The large tendon that is above and behind the hock in the rear leg of quadrupeds.

hand Term used to describe the height (at the point of withers) of a horse. It is the average width of a person's hand (4 in).

handbag leather Any leather used in making handbags. The most commonly used leathers for handbags are calf, patent (made primarily from cattle hides), goat, and sheep.

hand milking The manual milking of an animal as opposed to machine or mechanical milking.

haploid Refers to the $1n$ number of chromosomes in sex cells. Chromosomes are paired in body (somatic) cells. Sex cells contain one chromosome of each pair. *Haploid* means, then, having one of each kind of chromosome in the nucleus.

hard breeder (shy breeder) A female animal that has difficulty or is slow in conceiving.

hard keeper An animal that is unthrifty and grows or fattens slowly regardless of the quantity or quality of feed.

hatch To bring forth young from the egg or pupa by natural or artificial incubation.

hatchability The degree to which an egg or pupa will produce young by incubation.

hatching Emerging from an egg or chrysalis.

hay Dried forage (e.g., grasses, alfalfa, clovers) used for feeding farm animals.

haylage Low-moisture **silage** (35 to 55 percent moisture). Grass and legume crops are cut and wilted in the field to a lower moisture level than normal for grass silage, but the crop is not sufficiently dry for baling.

head-shy Designating a horse on which it is difficult to put on a bridle, to lead, or to work around its head.

heart girth A measurement taken around the body just in back of the shoulders of an animal, used to estimate body weight.

heat (estrus) Term used to describe the behavior of females during the fertile portion of the **estrous cycle**. Females are receptive to breeding during this time and may actively seek a mate.

heat of fermentation (HF) Heat produced anaerobically by microbes of the digestive tract. It is much greater in ruminants than in nonruminants.

heat of nutrient metabolism (HNM) The heat produced as a result of the utilization of absorbed nutrients.

heat increment (HI) The increase in heat production following consumption of food when an animal is in a thermoneutral environment. It consists of increased heats of fermentation and of nutrient metabolism. There is also a slight expenditure of energy in masticating and digesting food. This heat is not wasted when the environmental temperature is below the critical temperature. This heat may then be used to keep the body warm. Also called *work of digestion*. See also **heat increment of feeding**.

heat increment of feeding (HIF) The heat produced by an animal during fermentation in the gastrointestinal tract and during processing and use of food nutrients in the body. The HIF represents an inefficiency, unless the animal can use the heat to help keep the body warm in a cool or cold environment. It depends on species, diet quality, level of feed intake, and productive performance. In human physiology, the HIF is commonly referred to as **specific dynamic action (SDA)**.

heat period That period of time when the female will accept the male in the act of mating. In heat. **Estrous period**.

heat production (HP) Results from (1) the heat increment (heat of fermentation plus heat of nutrient metabolism) plus (2) the heat used for maintenance (basal metabolism plus heat of voluntary activity) when an animal is consuming food in a **thermoneutral zone**. In direct calorimetry, heat production is measured by use of an animal calorimeter.

heat stroke A condition caused by exposure to excessive heat; may occur in one of three forms: (1) sunstroke (thermic fever), (2) heat exhaustion, or (3) heat cramps.

heat tolerance The ability of an animal to endure the impact of a hot environment without suffering ill effects.

hectare A European unit of land measurement (2.47 acres). (See Appendix B.)

heel fly A name applied to the common cattle grub because it enters the body through the feet.

heifer A female of the cattle species less than 3 years of age that has not borne a calf. (See Appendix A.)

- helminth** An **intestinal** worm or wormlike parasite.
- hematopoietic** An agent that promotes the formation of blood cells.
- hemoglobin** The red pigment in red blood cells of animals and humans that carries oxygen from the lungs to other parts of the body. It is made of iron, carbon, hydrogen, and oxygen and is essential to animal life.
- hemolysis** The liberation of hemoglobin. Hemolysis consists of the separation of hemoglobin from the corpuscles and its appearance in the fluid in which the corpuscles are suspended. The freezing of blood causes hemolysis. Many microorganisms are able to hemolyze red blood cells by production of hemolysins.
- hemophilia** An inherited condition in which blood does not clot normally. An animal so affected may be called a **bleeder**.
- hen** An adult avian female (usually refers to chicken or turkey). (See Appendix A.)
- herbicide** A preparation for killing weeds.
- herbivorous (herbivore)** Pertaining to animals that can subsist on grasses and herbs.
- herd** A group of animals (especially cattle, horses, and swine) collectively considered a unit.
- herdmates (stablemates or contemporaries)** A term used when comparing records of a sire's daughters with those of all their nonpaternal herdmates, both being milked at the same season of the year (under the same conditions). Each daughter is compared with her herdmates that calved over a 5-month period (2 months prior and 2 months succeeding, plus the month the daughter calves). This is done to adjust for effect of seasonal differences. The *herdmate comparison* removes, from the evaluation of breeding value, complications arising from herd, year, and season of calving production variations and assumes that the measured production differences are due to inheritance. (See Chapter 9.)
- heredity** The hereditary transmission of genetic or physical traits of parents to their offspring.
- heritability (heritable)** A technical term used by animal breeders to describe what fraction of the differences in a trait, such as milk production, is due to differences in genetic value rather than environmental factors; variation due to genetic effects divided by the total variation (genetic plus environmental variation).
- heritability estimate** An estimate of the proportion of the total phenotypic variation between individuals for a certain trait that is due to heredity. More specifically, hereditary variation due to *additive* gene action.
- hermaphrodite** An individual possessing both male and female reproductive organs. May be capable of producing both ova and sperm; however, this seldom is true.
- hernia** The protrusion of an organ or part through some opening in the wall of its cavity. Also called **rupture**.
- heterogametic** This term refers to sex cells. In humans and livestock (except poultry) the male possesses an X and a Y chromosome and thus is *hetero-* (prefix meaning unlike) *gametic* in sex chromosomes. The female is XX, and so is *homo-* (alike) *gametic* for sex chromosomes. See also **homogametic**.
- heterosis (hybrid vigor)** Amount the **F₁ generation** exceeds the P₁ generation for a certain trait, or amount the crossbreds exceed the average of the two purebreds that are crossed to produce the crossbreds. Also called **nicking**.
- heterothermic mammals** Animals that have a fluctuating body temperature.
- heterozygote** An individual possessing one or more pairs of allelic genes for a given trait, each pair being different genes. For example, *Aa* or *Bb* or *AaBb* are hetero- (unlike) zygotes. Each parent contributed unlike genes with respect to any given allelic pair governing contrasted characters.
- heterozygous** Having the two alleles at corresponding **loci** on homologous chromosomes different for one or more loci.
- HI** See **heat increment**.
- hibernation (hibernate)** The ability of an animal to pass the winter in a dormant state in which the body temperature drops to slightly above freezing and metabolic activity is reduced nearly to zero. Hibernation is probably an adaptation to prevent starvation during periods of food scarcity.
- hidrosis** Excessive sweating.
- high-moisture silage** **Silage** containing 70 percent or more moisture.
- hinny** The offspring of a stallion and a jennet (female jackass).
- hip dysplasia** An orthopedic disease with abnormalities in the hip socket (acetabulum of pelvis) and the head of the femur (thigh bone).
- hip sweeney** A horse with atrophy of the hip muscles.
- hive** A home for honeybees, a container for bees. Also a swarm of bees.
- hobble** To tie the front legs of a horse together by means of a rope or straps so that it cannot run or kick.
- hogget** A sheep from weaning until its first shearing.
- homeostasis (homeokinesis)** The physiological regulatory mechanisms that maintain constant the "internal environment" of the organism in the face of changing conditions.
- homeostatic** (adj. of **homeostasis**) A relatively stable state of equilibrium; a tendency to uniformity or stability in the normal body states.
- homeostatically** Pertaining to **homeostasis**.
- homeothermic (homoiothermic)** Having a relatively uniform body temperature maintained nearly independent of the environmental temperature. Warm-blooded animals (mammals and birds) are homeothermic.
- homeotherms (endotherms)** The warm-blooded species. They maintain their *internal* temperature constant in the face of widely changing external temperature.
- homogametic** Forming **gametes** which all have the same type of sex chromosome. See also **heterogametic**.
- homogenized milk** Milk that has been treated to ensure breakup of fat globules to such an extent that after 48 h of quiescent storage at 45°F (7°C), no visible cream separation occurs on the milk. The reduced size of fat particles results in formation of a softer curd in the stomach.
- homologous chromosomes** From the Greek *homo* meaning "like" and *logous* meaning "proportion." The pairs of chromosomes (twins) in body cells. *Homologous* refers to chromosomes that are structurally alike.
- Homo sapiens** The species, including all existing races, of humans.
- homozygote** An individual possessing like genes for a pair of allelomorphs, for example, *AA* or *aa*. Having only one type of allele for a given trait.
- homozygous** Having the two genes at corresponding **loci** on homologous chromosomes identical for one or more loci.
- honey butter** A mixture of creamery butter and 20 to 30 percent liquid honey, used as a spread.

hood A protective device, usually providing special ventilation to carry away gases, in which dangerous chemical, biological, or radioactive materials can be handled safely.

hoof oil Pale yellow liquid obtained from skin, bones, and hooves of cattle. It is used in leather manufacture as a lubricating and waterproofing agent. Frequently called **neat's-foot oil**.

hormone A chemical substance secreted by an endocrine gland that has a specific effect on activities of other organs.

host Any animal or plant on or in which another organism lives as a parasite. Infected **invertebrates** (which are actually hosts in the true sense) are usually referred to as *biological vectors*.

hot Highly radioactive.

hovers An artificial heating unit that provides the heat source in a brooder unit for poultry. See **brooder**.

HP See **heat production**.

HTST High-temperature–short-time (see **pasteurization**).

humerus The bone that extends from the shoulder to the elbow.

humidity The mass of water vapor per unit volume. See **relative humidity**.

hutch A boxlike cage or pen for small animals.

hybrid A heterozygote, or progeny of genetically unlike parents.

hybridomas Plasma cells that are specific for one set of antigenic determinants are fused to myeloma cells (malignant plasma cells) to produce a single clone of antibody-producing cells that can be grown indefinitely in tissue culture. These cells produce huge quantities of **monoclonal antibodies**.

hybrid vigor See **heterosis**.

hydrogenate To combine with hydrogen (to reduce).

hydrolysis Chemical decomposition in which a compound is broken down and changed into other compounds by taking up the elements of water. The two resulting products divide the water, the hydroxyl group (OH) being attached to one and the hydrogen atom (H) to the other.

hydrolytic Capable of breaking an intramolecular bond by adding a molecule of water.

hydrolyze Splitting a compound into smaller fragments by the addition of water (the hydroxyl group, OH, is added to one fragment and hydrogen, H, is added to the other).

hydroponics Literally, water plants. These include grains grown by sprouting in chambers under conditions of controlled temperature and humidity to provide a source of green feed at times when it is impossible to produce it normally.

hygrometer An instrument used for determining the relative humidity of air.

hyper- A prefix signifying above, beyond, or excessive.

hyperemia Congestion, or an excess of blood in any body part.

hyperesthesia Excessive sensitivity of nerves.

hyperplasia The abnormal multiplication or increase in the *number* of normal cells in normal arrangement in a tissue.

hyperploid A plant or animal whose chromosome number is greater than a whole-number multiple of the haploid number, e.g., $2n + 1$ or $2n + 2$.

hyperpnea Panting (as in dogs); deep breathing.

hypertrophy The morbid (diseased) enlargement, or overgrowth, of an organ or part due to an increase in the *size* of its constituent cells.

hypo- A prefix signifying under, beneath, or deficient.

hypocalcemia A significant decrease in the concentration of ionic calcium, which results in convulsions, as in tetany, or parturient paresis.

hypophysectomy Surgical removal of the pituitary gland (hypophysis).

hypothalamic releasing factors Substances secreted by the hypothalamus that regulate the release of hormones from the anterior pituitary gland.

hypothermia The lowering of body temperature, as in treatment of extremely high fever. The patient is given a sedative to inhibit shivering. Then, under minimal anesthesia, he/she is placed in ice water or may have ice packs applied. The rectal temperature may drop to about 86°F in 1 to 2 h. Subnormal body temperature is often induced artificially to facilitate heart surgery.

hypothermy See **hypothermia**.

hypotrophy Degeneration, or loss of vitality, of an organ.

hysterectomy Partial or total removal of the uterus.

I

ice milk A frozen product resembling ice cream, except that it contains less fat (2 to 5 as opposed to 10 percent) and more NMS (12 as opposed to 10 percent) than ice cream. Both ice milk and ice cream contain a stabilizer or emulsifier and about 15 percent sugar.

identical twins Two individuals that developed from the same fertilized egg. The egg separated into two parts shortly after fertilization. If separation is late, Siamese (joined) twins or one individual with two heads or two bodies may result. Identical twins are genetically alike. Therefore all differences between them represent environmental effects.

idiopathy A morbid (diseased) state of spontaneous origin.

i.e. From the Latin *id est*. That is.

ileocecal valve Valve at the junction of the lower end of the small and large intestines (junction of ileum and cecum).

ill-being Condition or state of an animal experiencing illness.

imbibe To drink or inhale; to absorb moisture.

imitation milks Mixtures of nondairy ingredients (ingredients other than milk, milk fat, and nonfat milk solids) that are combined, forming a product resembling milk, low-fat milk, or skim milk. Sodium caseinate, although derived from milk, is commonly termed a nondairy ingredient and is often used as a source of protein in imitation milks. Vegetable oils are commonly used as the source of fat.

immunity The power an animal has to resist and/or overcome an infection to which most or many of its species are susceptible. Active immunity is attributable to the presence of antibodies formed by an animal in response to an antigenic stimulus. **Passive immunity** is produced by the administration of preformed antibodies. (See also Section 22.2.5.)

immunize To render an animal resistant to disease by vaccination or inoculation.

immunoglobulins A family of proteins in body fluids that have the property of combining with an **antigen** and, in the situation in which the antigen is **pathogenic**, sometimes inactivating it and producing a state of immunity or resistance to disease. Also called **antibodies**.

immunologic Producing immunity.

- immunological** Response of the immune system of a host to non-self **antigens**, providing protection from a particular disease or poison.
- immunology** The study of resistance to disease; the science dealing with the nature and causes of immunity from diseases.
- impaction** Constipation. See **compaction**.
- implant** The insertion of a slow-release pellet containing a growth-promoting hormone into the middle third of the back of a bovine ear. The pellets are often referred to as *implants*.
- impregnate** To fertilize a female animal.
- inbreeding** Production of offspring from parents more closely related than the average of a population. Genetically, inbreeding increases the proportion of **homozygous** genes in a population. For example, in a population of 100 individuals that are all **heterozygous** (*Aa*), none would be homozygous. However, in a population in which 50 were homozygous (*AA* or *aa*) and 50 were heterozygous (*Aa*), the percent homozygous pairs of genes at this locus would be 50.
- incaparina** A so-called food substitute that includes corn, cottonseed meal, and torula yeast. First marketed in 1957, consumer acceptance has been slow.
- incomplete dominance** A situation in which neither allele is dominant to the other. The result is that both are expressed in the phenotype, which is intermediate between the two traits.
- independent assortment** A situation in which the separation or segregation of one pair of alleles has no effect on any other; occurs when the different pairs of alleles are on nonhomologous chromosomes.
- indirect calorimetry** Measurement of the amount of heat produced by a subject by determining the amount of oxygen consumed and the quantity of nitrogen and carbon dioxide eliminated. The determination of heat production from the respiratory exchange.
- inert matter** Any material included in the diet that has no nutritive value. It may be used as a carrier for micronutrients.
- infection** The invasion and presence of viable bacteria, viruses, and/or parasites in a host that result in disease.
- infestation** An invasion of the body by arthropods, including insects, mites, and ticks.
- inflammation** The reaction of a tissue to injury, which tends to destroy (through increased white blood cells) or limit the spread of the injurious agent. It is characterized by pain, heat, redness, swelling, and loss of function.
- inflammatory** Accompanied by or tending to cause inflammation.
- inflection** The point in the growth curve of plants and animals at which growth rate ceases to increase and from which it begins to decrease.
- in foal** Designating a pregnant mare. Likewise, *in calf* refers to a pregnant cow.
- ingest (ingestion)** To take in food for digestion via the mouth; to eat.
- ingesta** Food or drink taken into the stomach.
- ingestive** Pertaining to or effecting the act of taking food into the body.
- inguinal** Pertaining to the groin.
- inhibine** A substance found in human sputum that is active against a number of bacteria.
- in milk** Designating a lactating female.
- innervation (innervated)** The distribution of nerves to an organ or body part.
- innocuity** Harmlessness; some vaccines have more innocuity and **efficacy** than others.
- inorganic** Pertaining to substances not of organic origin (not produced by animal or vegetable organisms).
- insect** An air-breathing animal (phylum Arthropoda) that has a distinct head, thorax, and abdomen.
- insecticide** A substance, such as a stomach poison, **contact poison**, or fumigant, that kills insects by chemical action.
- insensible** Commonly used to denote insensible heat losses, e.g., water vapor and carbon dioxide. Heat dissipation by vaporization.
- insidious** More dangerous than is apparent.
- in situ** In the natural or normal place; the normal site of origin.
- instar** Any one of the larval stages of an insect between molts.
- integrated reproduction management (IRM)** Reproductive efficiency in livestock is affected by many factors such as nutrition, genetics, disease, and physiological conditions. IRM is a concept of integrating, on a "systems" or whole-animal management basis, the various aspects of animal health, production, and genetics into an overall workable management system.
- integument** A covering layer, as the skin of animals or the body wall of an insect.
- inter-** A prefix meaning between.
- intercellular** Situated between the cells.
- intermediate host** A host in which a parasite develops only in part, before getting into its final (or definitive) host, where it develops to maturity.
- intermuscular** Situated between muscles.
- interphase** The period between successive mitotic divisions and the period of growth and usually duplication of chromosomes.
- interspecies** Between species.
- intestinal** Of or pertaining to the **intestine**.
- intestine** The lower portion of the alimentary canal from the stomach to the anus. Also called the **gut** or *bowels*.
- intolerable-response level** Extremely high level of homeokinetic response that an animal cannot tolerate for long.
- intra-** A prefix meaning "within."
- intracaudal** Situated or applied within the tissues of the tail.
- intracellular** Situated or occurring within a cell or cells.
- intracranial** Within the cranium.
- intracutaneous** Into or within the layers of skin.
- intra dermal** Within the dermis. An injection into the layers of skin.
- intramammary** Within the mammary gland, as injection into a mammary gland through a teat opening.
- intramuscular** Within the substance of a muscle, e.g., an injection into muscle.
- intrapertoneal** Within the cavity of the body that contains the stomach and intestines. Administration through the body wall into the peritoneal cavity.
- intrasternal** Within the sternum.
- intravenous** Within a vein or veins.
- intravenously** See **intravenous**.
- in utero** Within the uterus (intrauterine).
- inversion** Rearrangement of genes on a chromosome in such a way that their order is reversed or different.
- invertebrates** Animal species without a backbone. Aquaculture examples include shrimp and oysters.
- in vitro** Within an artificial environment, as within a petri dish or test tube.
- in vivo** Within the living body.

- involution** The return of an organ to its normal size or condition after enlargement, as of the uterus after childbirth. A decline in size or activity of other tissues; e.g., mammary gland tissues normally involute with advancing lactation. The drying-off process of lactating cows.
- iodinated casein** Milk protein (casein) that has been treated with iodine. It has the same physiological effect as thyroxine (hormone produced by the thyroid gland). It is commonly referred to as *thyroprotein* and is sometimes used to stimulate cows to secrete more milk.
- iodine value** The degree of unsaturation of the fatty acids in a fat or oil can be quantitatively expressed as the iodine value, which refers to the number of grams of iodine absorbed by 100 grams of fat. Because the iodine reacts at the sites of unsaturation, much as would hydrogen in hydrogenation, the higher the iodine value the greater the degree of unsaturation that existed in the fat.
- ion** An atom or a group of atoms (molecules) carrying an electric charge, which may be positive or negative. Ions are usually formed when salts, acids, or bases are dissolved in water.
- ionization** The adding of one or more *electrons* to, or removing one or more electrons from, atoms or molecules, thereby creating ions.
- ionizing radiation** Any radiation displacing electrons from atoms or molecules, thereby producing **ions**, e.g., alpha, beta, and gamma radiation and short-wave ultraviolet light. Ionizing radiation may produce severe skin or tissue damage.
- IRM** See **integrated reproduction management**.
- irradiated ergosterol** A **sterol** that has been activated into a form of vitamin D called ergocalciferol.
- irradiation (irradiated/irradiating)** The process of exposing (treating) materials (as in a nuclear reactor) to roentgen rays (X or γ -radiation) or other forms of radioactivity. An example of practical significance to nutrition is the application of ultraviolet rays to a substance to increase its vitamin D efficiency.
- irritability** The ability to respond to stimuli.
- is by** An indication of the male parent, referring to progeny.
- iso** From the Greek word *isos* meaning "equal." A prefix or combining form meaning "equal," "alike," or "the same;" e.g., "isocaloric" refers to the *same* caloric value.
- isotonic** Characterized by equal osmotic pressure; e.g., a solution containing just enough salt to prevent the destruction of the red corpuscles when added to the blood would be considered isotonic with blood. Describing a solution having the same concentration as the system or solution with which it is compared.
- isotope** An element of chemical character identical with that of another element occupying the same place in the periodic table (same atomic number), but differing from it in other characteristics, as in radioactivity or in the mass of its atoms (atomic weight). Isotopes of the same element have the same number of protons in their nucleus but different numbers of neutrons. A **radioactive isotope** is one with radioactive properties. Such isotopes may be produced by bombarding the element in a cyclotron.
- itis** A word termination (suffix) denoting **inflammation** of a part indicated by the word stem to which it is attached.
- IU** International unit. A unit of measurement of a biological (e.g., a vitamin, hormone, antibiotic, antitoxin) as defined and adopted by the International Conference for Unification of Formulas. The potency is based on the bioassay that produces a particular biological effect agreed on internationally. See **USP**.

J

- jack** A male uncastrated donkey (ass).
- jenny** A female donkey (ass). Also called a *jennet*.
- jerky** Long thin strips of sun-dried beef or lean meat.
- jowl** Meat taken from the cheeks of a hog.

K

- karyotype** The chromosomes of a plant or animal as they appear at the metaphase of a somatic division. Arrangement by pairs, size, and centromere location when presented for a species.
- katydid** A long-horned grasshopper of the family Tettigoniidae.
- keel bone** The breastbone of birds; the sternum.
- keratin** An insoluble complex protein that constitutes hair, horn, claws, and feathers.
- keratinization** The development of or conversion into keratin or keratinous tissue; cornification. See **keratosis**.
- keratosis** Any horny growth, such as a wart, causing the cornification, or hardening, of the epithelial skin layers.
- ketosis** See **acetonemia**.
- kid** A young goat or antelope up to the first birthday. (See Appendix A.)
- killed virus** A virus whose infectious capabilities have been destroyed by chemical or physical treatment.
- kilo-** A prefix that multiplies a basic unit by 1000.
- kilocalorie (kcal)** Equivalent to 1000 small calories.
- kip or kipskin** Light rawhide from a grass-fed, immature bovine animal (between the size of a calf and a mature animal).
- Kjeldahl** Relating to a method of determining the amount of nitrogen in an organic compound. The quantity of nitrogen measured is then multiplied by 6.25 to calculate the protein content of the food or compound analyzed. The method was developed by the Danish chemist J. G. C. Kjeldahl in 1883.
- kwashiorkor** A syndrome produced by a severe protein deficiency, with characteristic changes in pigmentation of the skin and hair, edema, anemia, and apathy.

L

- label** See **tracer isotope**.
- labile** Changeable or unstable. Readily or continuously undergoing chemical, physical, or biological change or breakdown.
- lactate (lactating)** To secrete or produce milk.
- lactation period** The number of days an animal secretes milk following each **parturition**.
- lacteal** Pertaining to milk.
- lactiferous** Secreting or conveying milk.
- lactogenesis** Initiating the secretion of milk.
- lactogenic** Stimulating the secretion of milk.
- lactometer** An instrument used to determine the specific gravity of milk, providing information for calculating the percentage of solids in a sample of milk.
- lactose** Milk sugar. A disaccharide composed of one molecule of glucose and one molecule of galactose.
- lamb** A sheep less than 12 months old. To give birth to a lamb. (See Appendix A.)
- lamb hog** A male lamb from weaning time until it is shorn.

- larva** (pl. **larvae**) The immature form of insects and other small animals, which is unlike the parent or parents and which must undergo considerable change of form and growth before reaching the adult stage; e.g., white grubs in soil or decayed wood are larvae of beetles. Caterpillars, maggots, and screwworms are also larvae.
- larvicide** A chemical used to kill the larval or preadult stages of parasites.
- larviparous** Bearing and bringing forth young that are larvae (especially of insects).
- larynx** The upper portion of the windpipe (trachea).
- latent** Hidden or not apparent.
- lateral** Of, at, from, or toward the side or flank.
- lateral line** The major sense organ in fish. It is comprised of a series of connected pores running the length of the trunk by which fish detect changes in water pressure or current.
- laying** The expulsion of an egg. The term is commonly associated with hens in active egg production. See **oviposition**.
- LD₅₀** The lethal dose for 50 percent of the animals tested.
- legume** Refers to those crops that can absorb nitrogen directly from the atmosphere through bacteria that live in their roots. Clovers, alfalfa, and soybeans are common examples of legumes.
- lesion** Injury or diseased condition reflected in discontinuity of tissues or organs, often causing loss of function of a part.
- lethal** Deadly; causing death.
- lethal gene** A gene, or genes, causing the death of an individual. Most lethal genes are **recessive** or partially dominant, requiring two genes of the same kind in a pair (**homozygous**) to cause death.
- leukocytes (leucocytes)** The white blood cells. They have amoeboid movements and include the lymphocytes, monocytes, neutrophils, eosinophils, and basophils.
- libido** Sexual desire or instinct.
- lice** Small nonflying biting or sucking insects that are true parasites of humans, animals, and birds.
- life cycle** The changes in form and mode of life that an organism goes through between recurrences of the same primary stage; life history.
- ligaments** Tissues connecting bones and/or supporting organs.
- ligate** To tie up, or bind, with a ligature.
- lignin** A compound that in connection with cellulose forms the cell walls of plants and thus of wood. It is practically indigestible.
- limit-fed** See also **limit feeding**. Refers to any method of feeding that restricts free access to diets and sets limits on quantity of feed consumed.
- limit feeding** Feeding animals to maintain weight and growth but not enough to fatten or increase production. Feeding animals less than they would like to eat.
- limiting amino acid** The essential amino acid of a protein that shows the greatest percentage deficit in comparison with the amino acids contained in the same quantity of another protein selected as a standard.
- limnology** The study of inland waters (lakes and ponds), especially with reference to their biological and physical features.
- linear accelerator** A device for increasing the velocity and energy of charged *elementary particles*, e.g., electrons or protons, through application of electric and/or magnetic forces.
- linebreeding** A form of inbreeding in which an attempt is made to concentrate the inheritance of some ancestor in the pedigree.
- linecross** A cross of two inbred lines.
- linkage** Refers to two or more genes carried on the same chromosome.
- linkage group** All the genes having loci on a particular chromosome.
- linked genes** Sets of genes that tend to be inherited together and that are presumed to have their loci on the same chromosome.
- lipid** Any one of a group of organic substances that are insoluble in water but are soluble in alcohol, ether, chloroform, and other fat solvents and have a greasy feel. They include fatty acids and soaps, neutral fats, waxes, steroids, and phosphatides (by U.S. terminology).
- Lippizan** A famous breed of Austrian horses. They are milk white in color at maturity.
- lipolysis** The hydrolysis of fats by enzymes, acids, alkalis, or other means to yield glycerol and fatty acids.
- litter** The pigs farrowed by a sow or the pups whelped by a bitch at one delivery period. Such individuals are called **littermates**. Also, the accumulation of materials used for bedding farm animals.
- littermates** A group of siblings in a **litter**-bearing species that are born at the same time.
- livability** The inherited stamina, strength, and ability to live and grow.
- livestock** Domestic farm animals kept for productive purposes (meat, milk, work, and wool); include beef and dairy cattle, sheep, swine, goats, and horses. Also called *stock*.
- local infection** An infection restricted to a small area, as an ear infection.
- locus** (pl. **loci**) Region of a chromosome where a particular gene is carried or located. The segment or part of a chromosome concerned with regulating a particular trait.
- loin** That portion of the back between the thorax and pelvis.
- long feed** Coarse, or unchopped, feed for livestock, such as hay, as contrasted to *short*, or *chopped*, or *ground* feed.
- lope** A slow gallop of a horse.
- low-fat milk** Milk that contains between 0.5 and 2 percent milk fat.
- low-moisture silage** **Silage** that contains 35 to 55 percent moisture. (See also **haylage**.)
- low-set** Designates a short-legged animal.
- lucerne** Alfalfa; a legume of high feeding value for ruminants.
- lumbar** Pertaining to the loins.
- lumen** The cavity on the inside of a tubular organ, e.g., the lumen of the stomach or intestine.
- luteal phase** The stage of the estrous cycle at which the corpus luteum is active and progesterone influence predominates.
- lymph** A transparent, slightly yellow liquid found in the lymphatic vessels. It may have a light-rose color because of the presence of red blood corpuscles.
- lymphocyte** A variety of white blood corpuscles that originate from the lymph **nodes** and thymus or bursa (birds).
- lyophilization** The evaporation of water from a frozen product with the aid of vacuum. Also called *freeze-drying*.
- lyophilized** See **lyophilization**.
- lysin** Antibody that causes the death and dissolution of bacteria, blood corpuscles, and other cellular elements.
- lysozyme** A substance present in human nasal secretions, tears, and certain mucus. It is also present in egg whites, in which it hydrolyzes polysaccharidic acids. It is bactericidal for only a few saprophytic bacteria and is inactive against pathogens and organisms of the normal **flora**.

M

macro Large or major. Abnormal size or length. Usually a prefix.

macrocyte An abnormally large erythrocyte (red blood cell) occurring chiefly in anemias.

macrocytic Characterized by abnormally large erythrocytes (red blood cells).

macroinvertebrate Invertebrate animals larger than zooplankton such as insect larvae. Large species of animals without a backbone.

macrophages Large **phagocytes**. Large scavenger cells, the function of which is primarily phagocytosis and the destruction of many kinds of foreign particles. These cells are strategically located in the spleen, liver, bone marrow, small blood vessels, and connective tissue. Collectively, they compose the monocyte–macrophage system (formerly known as the **reticuloendothelial system**).

macroscopic Visible to the unaided, or naked, eye.

maggot The larva of a fly.

maiden An unbred animal.

maintenance energy The amount of energy required to keep an animal in energy equilibrium and prevent the loss of body tissues or weight.

maintenance needs What an animal needs to maintain itself.

malnutrition Any disorder of nutrition. Commonly used to indicate a state of inadequate nutrition.

mammal (mammalian) Any animal that suckles or provides milk for its young.

mammilla The nipple of the female breast.

mandible Bone of the lower jaw.

manufacturing milk Milk used for the manufacture of dairy products, such as cheese, butter, powdered milk, and ice cream.

manure Excreta of animals; dung and urine (commonly with some bedding).

manured (soil) Soil to which manure has been applied.

marasmus From the Greek *marasmos* meaning “a dying away.” A progressive wasting and emaciation. **Enzootic** marasmus is a condition of malnutrition in domestic animals that is due to a deficiency of one or more trace elements, especially cobalt and copper.

marbling The distribution of fat in muscular tissue that gives meat a spotted appearance.

mare A mature female horse (usually more than 4 years of age).

mariculture Marine aquaculture which uses saltwater rather than freshwater animals.

market milk Milk that is consumed as fresh fluid milk. See **fluid milk**.

marsupial One of a class of mammals characterized by the possession of an abdominal pouch in which the young are carried for some time after birth.

marsupilia Pouched mammals, e.g., the kangaroo.

masculinity Physical appearance resulting from well-developed secondary male sex characteristics.

mass spectrometer An instrument for separation and measurement of isotopes by their mass.

mastication The chewing of food.

mastitis An inflammation of the mammary gland(s).

maternal Pertaining to the mother.

matrix The basic material from which a thing develops. A place or point of origin of growth.

matron A mare that has produced a foal.

mature equivalency (ME) Age-conversion formulas (provided by the **USDA** and breed associations) applied to the milk-production records of young cows to predict their expected *mature milk production* potential. Breed ME factors are used for comparative purposes in selecting and mating animals.

maturation The process of becoming mature.

maverick An unbranded animal, particularly a calf (also refers to a motherless calf in some areas). A **dogie**.

maxilia The upper jawbone in vertebrates.

ME See **mature equivalency**. See also **maintenance energy** and **metabolizable energy**.

meat analogues Material usually prepared from vegetable protein to resemble specific meats in texture, color, and flavor.

meat bird A fowl raised for its meat as contrasted to one kept for egg laying.

meconium The first excreta of a newborn animal.

median Situated in the middle; mesial.

median plane A line or plane (from cranial to caudal) dividing an animal into two equal halves.

megacalorie (Mcal) Equivalent to 1000 kcal or 1,000,000 cal. A megacalorie is equivalent to a *therm*.

meiosis A type of cell division that produces the sex cells, or **gametes**, possessing the *1n* (haploid) number of chromosomes. Thus the chromosome number of daughter cells is reduced to one-half the somatic number (chromosome number is reduced by one-half from diploid to haploid).

melanin A dark-brown or black pigment found in hair and/or skin.

mesenchyme Embryonic connective tissue that gives rise to the connective tissues of the body and blood vessels.

mesentery A membrane that supports a visceral organ, particularly the intestine, and contains the vessels and nerves that supply that organ.

meta- A prefix meaning “between” or “among;” indicating change, transformation, or exchange; after or next.

metabolic Relating or pertaining to the nature of metabolism; the synthesizing of foodstuffs into elements. See **metabolism**.

metabolic activity See **metabolism**.

metabolic body size The weight of the animal raised to the 0.75 power ($W^{0.75}$).

metabolism The sum total of the chemical changes in the body, including the building up (anabolic, assimilation) and the breaking down (catabolic, dissimilation) processes. The transformation by which energy is made available for body uses.

metabolite Any substance produced by metabolism or by a metabolic process.

metabolizable energy (ME) The food-intake gross energy minus fecal energy minus energy in the gaseous products of digestion (largely methane) minus urinary energy. For birds and monogastric mammals, the gaseous products of digestion need not be considered. See also **physiological fuel value**.

metabolize (metabolized) To perform **metabolism**. Chemical changes occurring within a living cell or organism which produce energy for vital processes and activities and assimilation of new material into the organism. To transform substances into energy and new materials for assimilation and uses by the body.

metamorphosis A change in shape or structure involving a transition from one developmental form to another, as in insects and frogs.

metaphase The second stage of mitosis, characterized by alignment of chromosomes on the equator of spindle fibers.

metritis An inflammation of the uterus.

MF Milk fat.

micro Small or minor. Usually a prefix, designating *tiny* or *microscopic* in size. Also, a prefix that divides a basic unit by 1 million.

microbiological assay The use of microorganisms to assay. See **bioassay**.

microflora The flora consisting of microorganisms. Commonly used in reference to the bacteria populating the rumen. (Protozoa are also present in the rumen.)

micromicro See **pico-**.

microphages Little **phagocytes**. Polymorphonuclear leukocytes that are formed in bone marrow. They are particularly active during bacterial infections.

microscopic Invisible to the unaided eye.

milk equivalent The quantity of milk, as produced, required to furnish the milk solids in manufactured dairy products to be sold: e.g., approximately 10 and 20 lb of whole milk is required to manufacture 1 lb of cheddar cheese and butter, respectively.

milk fat The lipid components of milk.

milk fever A nutritional disease defined by muscular **tetany** that is due to low blood calcium. Generally caused by the rapid removal of calcium from the bloodstream and the failure to balance the removal by mobilization of calcium from bone or absorption from the small intestine. Though found in most mammalian species, milk fever is most prevalent in high-producing dairy cattle.

milking string A group of dairy cattle within the milking herd that receive similar management on the basis of similar needs. Typical "string" examples would be early lactation–high-production cows or low production–late-lactation cows.

milk replacer A dry commercial feed product intended to be reconstituted with water to substitute for the use of herd milk in feeding young animals. Although generally thought to be for dairy calves, milk replacers are available for most livestock in case of special needs such as failure of dam to produce milk or loss of the dam.

milk serum The nonfat components of milk.

milli- A prefix that divides a basic unit by 1000.

minor stress responses Homeokinetic response to stress that is relatively minor in intensity, duration, or both.

miracidium The free-swimming larva of a trematode that penetrates the body of a snail host for further development into a **cercaria**.

miscible Designating two or more substances that when mixed together form a uniformly homogeneous solution.

miticide A compound that is destructive to mites. An acaricide.

mitosis A type of cell division in which cells with the $2n$ (diploid) number of chromosomes produce daughter cells that also possess the $2n$ (diploid) number of chromosomes. Thus the daughter cells receive the full complement of chromosomes existing in the original cell before division.

mitotic centers Two (usually) polarizing units of cells located opposite each other, like the spindle fibers oriented between the poles of a cell.

mode A statistical term referring to the value (number) that occurs the greatest number of times in a frequency distribution.

modified live virus A virus that has been changed by passage through an unnatural host, such as hog cholera virus passed through rabbits, so that it no longer possesses **pathogenic** characteristics but will stimulate antibody production and immunity when injected into susceptible animals.

molecular Of, produced by, or relating to **molecules**.

molecule A group of atoms held together by chemical forces. A molecule is the smallest unit of matter that can exist by itself and retain all its chemical properties.

molt (molting) The shedding and replacing of feathers (usually in the fall). Snakes and certain arthropods also shed their outer covering and develop a new one.

mongrel Animal of mixed or unknown breeding.

monoclonal antibodies These are antibodies with specificity against only one set of antigenic determinants. They are produced in large quantities by hybridomas and have virtually revolutionized immunology. Specific *monoclonal antibodies* have been used successfully for immunotherapy of cancer patients. These antibodies can also be used to develop immunodiagnostic techniques. See **hybridomas**.

monoestrous See **monoestrous animal**.

monoestrous animal An animal that has only one estrous (heat) cycle annually.

monogastric Having only one stomach or stomach compartment, as do dogs, humans, and swine.

monohybrid A trait in an individual controlled by a single pair of genes with a genetic makeup, e.g., of *Aa* or *Bb*.

monohybrid cross A cross involving one pair of alleles, each of which controls an alternative form of the same characteristic.

monorchid A male animal that has only one testicle in the scrotum. Also called a *ridgling*.

monotreme Any member of the lowest order of mammals (Monotremata), comprising the duckbill platypus and the echidnas, which lay eggs and have a common opening for the genital and urinary organs and the digestive tract. They nourish their young by a mammary gland that has no nipple, in a shallow pouch developed only during lactation.

monoxenous parasite A parasite that requires only one host for its complete development.

morbid Diseased or unhealthy.

morbidity The state of being diseased. The ratio of the number of sick individuals to the total susceptible population.

morphogenesis The origin and evolution of morphological characters (form and structure). The establishment of shape and patterns.

morphologically (adv. of morphologic) Pertains to the form and structure of animals and their body parts.

morphology The science of the forms and structures of animal and plant life without regard to function.

mortality Death. Death rate.

morula A developing embryo at day 5 or 6 postfertilization characterized by a solid cluster of about 32 cells.

mount To copulate with, as certain male animals mount a female in the act of coitus.

mounted See **mount**.

mule The cross resulting from mating a mare horse with a jack (male ass).

muley A **polled** cow.

multiparous Producing many (more than one) offspring at one time. Also having experienced one or more **parturitions**.

multiple alleles Two or more alleles at the same locus on one pair of homologous chromosomes, affecting the same trait but in a different way. For example, in humans, gene *A* produces antigen *A*; gene *B*, antigen *B*; and gene *a*, neither antigen (or the O blood type). All three alleles may be at the same locus in a population, but only one is in a **gamete** and only two are in body cells. Thus, *multiple alleles* describes a condition in which three or more forms of the same gene exist, any one of which may occupy a specific locus at any given time.

multiple stimuli Situation where more than one environmental factor—acting either simultaneously or sequentially—elicits an animal's homeokinetic response.

mummified fetus A shriveled or dried **fetus** that has remained in the uterus instead of being aborted or expelled.

muscle catabolism Breaking down of muscle tissues. The proteins from the muscles may be deanimated and used for energy. Destructive **metabolism** involves the release of energy and results in breakdown of muscle.

musculature The muscular system of any body part.

mustang A wild horse, ridden by cowboys of the western plains, that descended from Spanish horses. The name is derived from the Spanish *mustengo* meaning "wild."

mutation A change in a gene, often resulting in a different phenotype. More specifically, a change in the code sent by a gene, causing the formation of a different protein by the cytoplasm of the cell. A permanent, transmissible change in the characteristics of an offspring from those of its parents.

mutton The flesh of a grown sheep as opposed to that of a lamb. Goat meat is also called *mutton* in some countries.

myalgia Muscular pain or rheumatism.

mycotoxins Toxic metabolites produced by molds during growth on a suitable substrate.

myiasis A disease that is due to the presence of fly larvae in the flesh of warm-blooded animals.

myositis Inflammation of a voluntary muscle.

N

nag A horse or pony of nondescript breeding.

nanism Dwarf growth.

nano- A prefix that divides a basic unit by 1 billion (10^9).

nape Back of the neck of an animal.

nares The olfactory openings in fish analogous to the nose. In fish these are not connected to the respiratory system.

National Research Council See **NRC**.

natural immunity Immunity to a disease or infestation which results from qualities inherent in an animal. See **immunity**.

natural radiation Background radiation.

natural service In farm animals, it means to allow natural mating, as opposed to artificial insemination.

NDM Nonfat dry milk. The product obtained by removing water from pasteurized skim milk. It contains not more than 5 percent moisture and not more than 1.5 percent **MF** unless otherwise indicated.

near In describing horse gaits "near" is the side closest to the inside of an arena where the judge stands.

neat's-foot oil A yellowish oil prepared by boiling the bones and joints of cattle (and sometimes of horses and sheep) and skimming off and clarifying the oil obtained.

necropsy An examination of the internal organs of a dead body to determine the apparent cause of death. Also called **autopsy**, **postmortem**.

necrosis Death of tissue, usually in individual cells, groups of cells, or small localized areas.

necrotic Pertaining to or affected with **necrosis**.

neigh The characteristic cry of a horse.

neonatal The period immediately following birth. Relating to or affecting the newborn human infant or farm animal. See also **neonate**.

neonate A newborn infant. A child less than one month old.

net energy (NE) The difference between **ME** and the heat increment; includes the amount of energy used either for maintenance only or for maintenance plus production.

net energy for maintenance (NE_m) The portion of net energy expended to keep the animal in energy equilibrium. (There is no net loss or gain of energy in the body tissues.)

net energy for production (NE_p) The portion of net energy required in addition to that needed for body maintenance that is used for work or for tissue gain (growth and/or fat production) or for the synthesis of productive end products (a fetus, milk, eggs, wool, fur, or feathers).

NFE See **nitrogen-free extract**.

NFS Nonfat solids of milk. They comprise proteins, lactose, minerals, and other water-soluble constituents of milk. Also called **SNF** (solids-not fat) and **NMS**.

nickng Breeding of progeny that are superior to their parents. Also called **heterosis**.

nit The egg of a louse or similar insect.

nitrogen balance The nitrogen in the food intake minus the nitrogen in the feces minus the nitrogen in the urine. Nitrogen retention.

nitrogen-free extract (NFE) Comprises the carbohydrates, sugars, starches, and a major portion of the material classed as hemicellulose in feeds. When crude protein, fat, water, ash, and fiber are added and the sum is subtracted from 100, the difference is the NFE.

NMS Nonfat milk solids. See **NFS**.

nocturnal Of the night; a nocturnal parasite is one that is active at night.

nodes Small, distinct masses of one kind of tissue enclosed in a different kind of tissue; lymph nodes are small masses of lymphatic tissue and serve as the main sources of lymphocytes. They are a site of antibody production by lymphocytes, and also serve as a defense system for the removal of noxious agents such as bacteria and fungal organisms carried into the nodes by lymph vessels.

nondisjunction Failure of a pair of homologous (sister) chromosomes (dyads) to separate during the reductional division of **meiosis**. Thus both chromosomes go into a **gamete** (usually only one of each pair goes into a gamete).

nonfat dry milk See **NDM**.

nonreturn The breeding efficiency of bulls expressed as the percentage of cows that conceive on the first service.

nonruminant An animal without a rumen, e.g., a chicken, pig, or dog.

nonseasonally polyestrous Describes the tendency of some species, or some breeds within species, to have multiple **estrous cycles** primarily during two distinct seasons of the year. For example, ewes of the Rambouillet breed typically cycle in the fall months, become **anestrous** during the winter, and then cycle again during the spring months.

notching Cutting dents in the ears of animals for identification.

noxious Harmful, not wholesome.

NPN Nonprotein nitrogen (e.g., urea).

NRC National Research Council. A division of the National Academy of Sciences established in 1916 to promote effective utilization of the scientific and technical resources available. This private, nonprofit organization of scientists periodically publishes bulletins giving the nutrient requirements of domestic animals. Copies are available through the National Academy of Sciences–NRC, 2101 Constitution Avenue NW, Washington, DC 20418.

nuclear reactor A device in which a fission chain reaction can be initiated, maintained, and controlled. Its essential component is a core with fissionable fuel.

nucleoside A compound composed of a nitrogen base and a sugar.

nucleotide A compound composed of a nitrogen base, a sugar, and a phosphate.

nucleus (pl. **nuclei**) A deep-staining body within a cell, usually near the center; the heart and brain of the cell, containing the chromosomes and genes. Also, the small, positively charged core of an **atom**. All nuclei contain both *protons* and *neutrons*, except the nucleus of ordinary hydrogen, which consists of a single proton.

nuclide A general term applicable to all atomic forms of the elements.

nulliparous Having never given birth to viable young.

nurse To suckle; to give milk to (e.g., a baby, a calf, or other mammal).

nurse cow A milk cow used to supply milk for nursing calves other than her own.

nutraceutical A nutrient that produces a healthful effect beyond its normal nutritional effect.

nutrient A substance (element or ingredient) that nourishes the **metabolic** processes of the body. It is one of the many end products of digestion.

nutrient-to-calorie ratio An expression of nutrients in weight per unit of energy needed. For example, the protein-to-calorie ratio is expressed as the grams of protein ($N \times 6.25$) per 1000 kcal metabolizable energy (grams of protein per 1000 kcal ME). This same dimension may be extended to other nutrients such as grams of calcium per 1000 kcal.

nutrilite A nutritional element.

nutriment That which is required by an animal as a building material and fuel (nourishment).

nutrition The science encompassing the sum total of processes that have as a terminal objective the provision of nutrients to the component cells of an animal.

nutritive ratio (NR) The ratio of digestible protein to other digestible nutrients in a foodstuff or diet. (The NR of shelled corn is about 1:10.)

nymph The immature stage of insects having only three stages (egg, nymph, and adult) in their development. Nymphs resemble adults in form and appearance (as contrasted with larvae, which do not resemble their adults) but do not have wings.

O

obligate parasite A parasite incapable of living without a host.

occult Obscure; concealed from observation; difficult to understand.

oestrus See **estrus**.

off In describing horse gaits “off” is the side that is away from the judge against the outside wall or fence of the arena.

offal The internal fat of cattle. The viscera and trimmings of a slaughtered animal removed in dressing. Also, the by-products of milling used especially for livestock feeds.

off-feed Having ceased eating with a healthy and normal appetite.

official production record Standard DHIA and DHIR records pertaining to milk production that are made under the supervision of an unbiased individual. Records are used for management purposes (e.g., feeding and culling), genetic evaluation (sire summaries), publicity, and sales. See **DHIR**.

offspring The sons and daughters of parents.

oil gland Gland at the base of the tail in chickens, ducks, turkeys (and most wild birds) that secretes an oil used by birds in preening their feathers. Also called *preen gland*.

olfactory Pertaining to the sense of smell.

omasum The third division of the stomach of ruminant animals. Also called *manifold*, *manyplies*, and *psaiterium*.

omnivore An animal that subsists on feed of every kind, plant and animal. Humans are omnivorous animals.

onager Wild ass of southwestern Asia.

on the hoof Designating a living meat animal.

oocyst The encysted **zygote** or embryonic stage in some parasitic life cycles.

opaque Not letting light through; neither transparent nor translucent.

open A term commonly used of farm mammals to indicate a nonpregnant status.

opisthotonos A form of tetanic spasm in which the head and heels are bent backward and the body bowed forward.

opsonins Antibodies of blood serum that sensitize (weaken or coat) the cells of microorganisms so that they are readily ingested, or engulfed, by phagocytic body cells (white blood cells).

oral (orally) Pertaining to the mouth. See **per oral** and **per os**.

orchidectomy Surgical removal of the testes.

orchitis An inflammation of a testis.

organic Pertaining to substances derived from living organisms. Referring to carbon-containing compounds.

organic farm products Pertains to growing/producing foods using only natural sources of soil nutrients (no use of chemical fertilizers, sprays, insecticides, or herbicides).

organism Any complete living plant or animal.

organogenesis The origin or development of the organs of an animal.

orifice Entrance or outlet of a body cavity.

orthopnea Inability to breathe except in the upright position. This state is common during dehydration exhaustion and with congestive heart failure.

osmosis The tendency of two fluids of different strengths that are separated by something porous (a semipermeable membrane) to diffuse or spread through a membrane or partition until they are mixed. Osmosis is the chief means by which the body absorbs food and liquids. Specifically, it is the tendency of a fluid of lower concentration to pass through a

semipermeable membrane into a solution of higher concentration.

osmotic pressure The force acting on a semipermeable membrane placed between a solution and its pure solvent, caused by the flow of solute molecules through the membrane toward the pure solvent.

osteofibrosis A loss of calcium salts from the bones that causes them to become fragile. It occurs chiefly in horses but may affect pigs, goats, and dogs.

osteogenesis Formation of bone.

osteomalacia A condition marked by softening of the bones, pain, tenderness, muscular weakness, and loss of weight. It results from a deficiency of vitamin D or of calcium and phosphorus. May also be caused by an overactive parathyroid gland.

osteoporosis A reduction in total bone mass. This disorder of bone metabolism occurs in middle life and older age in both men and women. The bone becomes porous and thin because of a failure of the osteoblasts (bone-forming cells) to lay down bone matrix. This disorder may result from a (1) dietary deficiency of calcium and/or protein, (2) lowered calcium absorption, (3) hormonal disturbance, or (4) combination(s) of the above.

osteosclerosis Abnormal hardening of bone.

outcross Mating of an individual to another in the same breed that is not closely related.

out of Refers to *mothered by* in animal breeding.

ova See **ovum**. Female reproductive cells (pl. of ovum). The human ovum is a round cell about 0.1 mm in diameter.

ovary Female reproductive gland in which the ova (eggs) are formed.

overdominance A type of gene expression in which the heterozygote *Aa* is superior to either homozygote *AA* or *aa*. Interaction between genes that are alleles.

overo A color pattern of Pinto horses. The horse appears to be colored with jagged white markings usually originating on the horse's side or belly and spreading toward the neck, tail, legs, and back. The color appears to frame the white. The horse often has a dark tail, mane, legs, and backline.

ovicide Any substance that kills parasites in the egg stage.

ovine An animal of the subfamily Ovidae; sheep, goats.

oviparous Producing offspring from eggs that hatch outside the body.

oviposition The laying (expelling) of a fully developed egg.

ovoviviparous Producing eggs within the maternal body. The eggs hatch within or immediately after extrusion from the parent.

ovulation The shedding of a mature follicle (**ovum**) by the ovary.

The ovary of a hen contains a series of follicles (called the *follicular-size hierarchy*). After ovulation, the smaller follicles advance one position in size and reestablish the hierarchy as it existed just before ovulation.

ovum The female reproductive cell (**gamete**), which, after fertilization, develops into a new member of the same species. The male gamete is the **sperm**.

ox (pl. **oxen**) Any species of the bovine family of ruminants. Specifically, a domesticated and castrated male bovine used for work purposes.

oxidase Enzyme that activates oxygen.

oxidation Chemically, the increase of positive charges on an atom or the loss of negative charges. There may be a loss of one electron (univalent O) or two electrons (divalent O). The combining of oxygen with another element to form one or more new substances. Burning is one kind of oxidation. Also called *oxydation*.

P

pace (1) rate of movement; (2) a manner of walking; (3) a special gait in horses in which the legs move in lateral pairs and support the horse alternately on the left legs and right legs; this is a fast two-beat gait.

packer One who operates a slaughter and meat-processing business.

paint A coat color of horses (white patches interspersed with darker colors, usually brown or black); also, a breed of horses.

paired feeding (food equalizing) A method of comparing nutritional effects at an arbitrary low level set by the animal that consumes the least food. Littermates or twins (especially monozygous ones) are considered best for paired-feeding studies.

palatability The relative relish with which feeds are consumed by animals.

palatable Acceptable or even "savory" to the taste.

paleontology The study of fossil remains.

palomino Color of horses: golden coat with light-blond or silvery mane and tail.

pandemic Prevalent (as a disease) throughout an entire country or continent or the world.

Papanicolaou stain A method of staining smears of various body secretions from the respiratory, digestive, or genitourinary tracts. It is used to diagnose cancer or the presence of a malignant process. Exfoliated cells of organs, such as the stomach or uterus, are obtained, smeared on a glass slide, and stained for microscopic examination. It was named for the Greek physician George Papanicolaou, who developed it. The slides are also known as *Pap smear*.

parakeratosis Any abnormality of the stratum corneum (horny layer of epidermis) of the skin (especially a condition where nuclei are retained in the upper layers showing defective keratinization).

parasite An organism that lives at least for a time on or in and at the expense of living animals.

parasitic Of an organism that lives on or in another organism known as the host.

parasiticide An agent or drug destructive to parasites.

parchment Tanned sheepskins. Vellum is essentially the same as parchment except that it is made from calfskin. Parchment is used for diplomas, records, banjos, drumheads, lampshades.

parental combinations Genotypes and phenotypes like those of the parents in a particular cross.

parental generation P₁ The first generation in a particular genetic experiment; frequently purebreeding lines.

parenteral Pertaining to administration by injection, not through the digestive (food) tract, i.e., such as subcutaneous, intramuscular, intramedullary, intravenous.

paralysis Partial paralysis that affects the ability to move but not the ability to feel.

parrot mouth A malformed mouth of an animal (most common in horses) in which the upper jaw abnormally protrudes beyond the lower jaw.

parthenogenesis (parthogenesis) Reproduction by the development of an egg without its being fertilized by a spermatozoon, e.g., drone bees. It occurs in certain lower animals and has been observed in turkeys. It does not occur in mammals.

partial dominance A situation in which one gene of a pair of alleles is not completely dominant with respect to another. For example, in compressed Hereford cattle an individual that possesses no compressed genes or is of genotype *cc* is of normal size, those that possess two compressed genes *CC* are dwarfs, and those that possess one compressed gene *Cc* are midway in size between dwarfs and normals.

particle A minute constituent of matter. The primary particles involved in radioactivity are *alpha particles*, *beta particles*, *neutrons*, and *protons*.

parturient paresis A condition caused by a low blood-calcium concentration that results in partial to complete paralysis soon after parturition. Also called **milk fever**.

parturition The act or process of giving birth to young.

passerine Belonging to or having to do with the very large group of perching birds, including more than half of all birds, such as warblers, sparrows, chickadees, wrens, thrushes, and swallows.

passive immunity Disease immunity given to an animal by injecting the blood serum from an individual already immune to that disease. Newborns also receive passive immunity by absorption of antibodies from colostrum. See **immunity**.

pasteurization The process of heating milk to at least 145°F (62.8°C) and holding it at that temperature for not less than 30 min (holding method) or to 161°F (71.7°C) for 15 s (**HTST**).

pasture Plants such as grass grown for feeding or grazing animals. To feed cattle and other livestock on pasture.

patency The condition of being open or unobstructed.

patent leather A term associated with the finish produced by the covering of the surface of leather with successive coats of daub and varnish. Most patent leather is made from cattle hides or **kips**, although horsehide, goatskin, kidskin, and calfskin are sometimes used.

paternal Pertaining to the father or male parent.

pathogen Any disease-producing microorganism or virus.

pathogenic Capable of producing disease.

pathogenic organism A disease producer.

pathology The branch of science dealing with disease, especially with structural and functional changes in tissues and organs of the body affected by disease.

paunch (rumen) The first stomach compartment of a ruminant. See **rumen**.

PD See **predicted difference**.

pecking order The system of social order in poultry exhibited by animals higher on the dominance scale physically pecking at animals lower on the scale.

pectoral Pertaining to the breast. Situated in or on the chest.

pectoral fins Either of a pair of fins in fishes that are attached in line with the gills in the thoracic region corresponding to the forelimbs of higher vertebrates.

pedigree A list of an animal's ancestors, usually only those of the five closest generations.

pelagic Fish that are free-swimming in the open parts of a body of water away from the bottom.

pelt The natural, whole skin covering, including the hair, wool, or fur of smaller animals, such as sheep and foxes.

penetrance A genetic term that refers to the percentage of times a phenotype actually shows up when it is expected.

percutaneous Performed or introduced through the skin, as an injection.

performance criteria Standards based on ultimate efficacy with respect to animal performance as well as on engineering bases by which an animal accommodation is designed.

performance records Information documenting the performance of individual animals such as average daily gain, days to weaning weight, and number of offspring produced per litter.

perfusion The act of pouring through or immersing in a physiological fluid, e.g., blood or saline.

pericardium Membrane that encloses the cavity containing the heart.

perineum Anatomical region of the body between the thighs, especially between the anus and the genitals.

periodic table (periodic chart) A table or chart listing all the elements, arranged in order of increasing **atomic numbers** and grouped by similar physical and chemical characteristics into "periods." The table is based on the chemical law that physical or chemical properties of elements are periodic (regularly repeated) functions of their **atomic weights**. (See Appendix E.)

periosteum The membrane that covers bone.

perissodactyl Having an uneven number of toes on each foot. A hooved animal with an uneven number of toes, such as a horse.

peristalsis The rhythmic contractions and movements of the alimentary canal.

peritoneum The membrane that lines the abdominal cavity and invests the contained viscera (digestive organs).

per oral Administration through the mouth.

per os Oral administration (by the mouth).

perosis A disease of chicks marked by bone deformities and associated with deficiency of certain dietary factors, such as biotin, choline, folic acid, or manganese. Also called *slipped tendon* or *hock disease*.

per se By, of, or in itself. As such.

Persians Crust leathers made from India-tanned hair (as opposed to wool growth) sheepskin. Leather from "bastard skins" (see **bastard**) is sometimes designated as Persian. Also a long-haired breed of cats.

pesticide A compound used to control any plant or animal considered to be a pest.

PFV See **physiological fuel value**.

pH A symbol used (with a number) to express acidity or alkalinity in analyzing various body secretions, chemicals, and other compounds. It represents the logarithm of the reciprocal (or negative logarithm) of the hydrogen-ion concentration (in gram atoms per liter) in a given solution, usually determined by the use of a substance (indicator) known to change color at a certain concentration. The pH scale in common use ranges from 0 to 14, pH 7 (the hydrogen-ion concentration, 10^{-7} or 0.0000001, in pure water) being considered neutral; 6 to 0, increasing acid; and 8 to 14, increasing alkali.

phagocytes From the Greek *phago* meaning "eat" and *kytos* meaning "cell." Defensive cells (leukocytes, or white blood cells) of the body that ingest and destroy bacteria and other infectious agents. See also **macrophages** and **microphages**.

phagocytosis (phagocytizing) The engulfing of microorganisms, cells, or foreign particles by phagocytes (certain forms of leukocytes).

pharyngeal Of or pertaining to the pharynx.

pharynx The tube, or cavity, that connects the mouth and nasal passages with the esophagus (throat).

- phenocopy** A phenotype determined by environment that mimics the same phenotype produced by heredity (genotype).
- phenotype** Expression of genes that can be measured by the human senses. What is seen in an animal for some trait. For simply inherited traits such as coat color in Holsteins, either black and white or red and white is seen.
- phenotypic** Pertains to the visible expression of genes that can be measured by human senses in domestic animals. Phenotypic characteristics reflect an interaction of the **genotype** and the environment.
- pheromone** A substance secreted externally by certain animal species (especially insects) to affect the behavior (especially sexual) or development of other members of the species. The queen substance of honeybees that inhibits ovary development in workers is a pheromone. Also called *assembling scent* and *sex pheromone* in insects.
- phoresy** That form of symbiosis in which one symbiont rests on or attaches to another for means of transportation.
- phosphatide** See **phospholipid**.
- phospholipid** A lipid containing phosphorus that on hydrolysis yields fatty acids, glycerin, and a nitrogenous compound. Lecithin, cephalin, and sphingomyelin are examples. Also called *phosphatide*.
- photoperiodism** The physiological response of animals and plants to variations of light and darkness.
- physiological fuel value (PFV)** Units (expressed in calories) of food energy in human nutrition. It corresponds to **metabolizable energy** as related to domestic animals.
- physiological saline** A salt solution (0.9% NaCl) having the same osmotic pressure as blood plasma.
- physiology** The science that pertains to the functions of organs, systems, and the whole living body.
- phyto-** A prefix meaning "pertaining to plants."
- phytoplankton** Free-living plants in a body of water, usually **algae**. Serves as food for sea animals.
- pica** A craving for unnatural articles of food, such as is seen in hysteria, pregnancy, and phosphorus deficiency. A depraved appetite.
- pico-** A prefix; divides a basic unit by 1 trillion (10^{12}). Same as *micromicro*.
- piebald** A horse having a black coat with white spots.
- pig** A young swine weighing less than 120 lb. (See Appendix A.)
- pigeon-toed** Designating a horse or other animal whose feet (toes) turn inward.
- piglet** A young pig.
- pincers** The incisor teeth of a horse. Also called *nippers*.
- pinocytosis** The absorption of liquids by cells.
- pinto** Designating a horse that has a spotted or piebald coat color (white spots on any dark background).
- pipped egg** An egg through which the chick has forced its beak in the first step of breaking out of the shell during incubation.
- pithing** A method of animal slaughter in which the spinal cord is severed to cause death and/or to destroy sensibility.
- Pituitrin** Trademark for posterior pituitary injection (oxytocin).
- placebo** In Latin means "I shall please." An inactive substance or preparation given to please or gratify a patient. Also used in controlled studies to determine the **efficacy** (virtue) of medicinal substances.
- placenta** The organ joining mother and offspring during pregnancy. It provides endocrine secretions and selective exchange of nutrients to the offspring and carries waste products away from the offspring.
- placentitis** Inflammation of the placenta.
- plain** A term suggesting general inferiority; coarse, lacking the desired quality.
- plasma** The liquid portion of blood or lymph in which the corpuscles or blood cells float.
- plasmolysis** A process causing water to leave the cell (contraction of protoplasm), as in the use of high concentrations of nontoxic salts and sugar for bacteriostatic purposes.
- pleasure horse** Horse used for riding, driving, or racing.
- pleiotropism** The action of one gene on two or more traits.
- pleiotropy** The state in which one gene affects two or more traits.
- PLM** The acronym indicating protein, lactose, and minerals of milk.
- poikilothermal** Having a variable body temperature or one which corresponds to the environment; capable of enduring marked variations of cold and heat; pertaining to or characterized by **poikilothermy**.
- poikilotherms (ectotherms)** Cold-blooded animals; animals having a body temperature that varies with the environment. Ocean fish exemplify cold-blooded species.
- poikilothermy** The ability of animals to adapt themselves to variations in their environmental temperature. The quality of varying the body temperature with the environmental temperature. Most invertebrates, fish, amphibians, and reptiles are poikilotherms.
- polled (polledness)** A naturally hornless animal.
- polyculture** Raising mixed species of fish in the same culture unit.
- polydipsia** An excessive thirst.
- polygastric** Possessing more than one (many) stomach or stomach compartments; characterizing the cow and other ruminants.
- polygenic (multiple-factor) inheritance** Inheritance involving a series of independent genes; characterized by the trait showing a continuous distribution pattern owing to the additive effect of genes, none of which show dominance.
- polymer** A large molecule composed of repeating smaller units.
- polyneuritis** Inflammation of many nerves concurrently.
- polyp** A smooth, stalked, or projecting growth from a mucous membrane.
- polyploidy** Complete duplication of all sets of chromosomes giving $3n$, $4n$, etc., numbers of homologous chromosomes in body (somatic) cells.
- polypnea** A condition in which the respiration rate is increased; rapid, shallow breathing.
- polyspermy** Entrance of many (poly) spermatozoa into the ovum at the time of fertilization.
- polyunsaturated** Fatty acids having multiple double bonds within the carbon chain.
- pony** A small horse, commonly less than 58 in tall at maturity.
- porcine** Pertaining to swine.
- porker** A young hog (pig).
- portal system** The system of blood vessels conveying blood from the digestive organs and spleen to the liver.
- posterior** Denotes the back or back portion (**caudal**). It means the same as **dorsal** surface of the body in human anatomy.
- postlegged** Describing an animal (especially a horse) with too much set in the hocks, resulting in the hind legs being too straight.

- postmortem** An examination of an animal carcass or human body after death. **Necropsy, autopsy.**
- postnatal** Occurring after birth.
- postnatum** Related to occurring after or an event following birth.
- postpartum** Occurring after birth of an offspring.
- pot-bellied** Designating any animal that has developed an abnormally large abdomen. Also a breed of miniature swine.
- poult** An immature turkey. After the sex can be determined, the turkey is called a *young tom* (male) or *young hen* (female). (See Appendix A.)
- poultry** Birds raised for meat and eggs.
- power clusters** Groups seeking public backing of legislative and other governmental actions that enhance/support stakeholder interests.
- ppm** Parts per million (1 mg/liter).
- precipitin** Antibody that forms a precipitate with its soluble antigen. An antibody formed in blood serum as a result of inoculating with a foreign protein.
- preconditioned** Prepared for weaning and movement to a feedlot environment commonly by starting on dry feeds and the administration of a prescribed set of inoculations (vaccines).
- precursor** A compound or substance from which another is formed.
- predatism** Intermittent parasitism, such as the attacks of mosquitoes and bedbugs on humans.
- predator** Any animal, including an insect, that preys on and devours other animals, e.g., a coyote or dog preying on sheep. Some predators, such as ladybugs, may be beneficial in that they kill and eat parasites.
- predicted difference (PD)** A measure of a bull's ability to transmit milk-producing capacity to his daughters. The PD may be positive or negative, depending on whether the bull's daughters yield more or less milk than daughters of other bulls (**herdmates**) under the same conditions.
- preen gland** See **oil gland**.
- prehension** The seizing (grasping) and conveying of food to the mouth.
- premortal** Existing or occurring immediately before death.
- prepartum** Occurring before birth of the offspring. Before **parturition**.
- prepotent** Designating an animal that transmits its own characteristics to its progeny to a marked or highly uniform degree.
- prick** To pierce or cut the tail of a horse so that it will be carried higher.
- primates** Humans, monkeys, and the great apes.
- primiparous** Bearing or having borne only one young or set of young.
- prodome** A symptom indicating the onset of a disease.
- produce** A female's offspring. The *produce of dam* commonly refers to two offspring of one dam.
- progeny** The offspring of animals.
- progeny testing** Evaluating the genotype of an individual by a study of its progeny.
- progestational** A phase of the estrous cycle (menstrual cycle) in which the corpus luteum is active and the endometrium is under its influence.
- prolapse** Abnormal protrusion of a part or organ; displacement of an organ from its normal location.
- prolapsed uterus** A condition in which the uterus is partially or completely turned inside out, usually following parturition.
- proliferation (proliferate)** Growth by rapid *multiplication* of new cells.
- prolific** Capable of producing abundant offspring.
- prophase** The first stage of mitosis, characterized by chromosome shortening and thickening and the disappearance of nuclear membrane as well as by the appearance and polarization of spindle fibers.
- prophylactic** A preventive, preservative, or precautionary measure that tends to ward off disease.
- prophylaxis** The prevention of disease.
- prostaglandins** A large group of chemically related 20-carbon hydroxy fatty acids with variable physiological effects in the body. (See Chapter 11.)
- prostate** Gland in the male reproductive system that lies just below the bladder and surrounds part of the canal (urethra) that empties the bladder.
- protean** Variable; readily assuming different shapes or forms; changeable.
- protective antibodies** Antibodies that when combined with pathogenic organisms render them noninfectious.
- protein** A substance composed of amino acids, containing about 16 percent (molecular weight) nitrogen. Thus protein content is computed by multiplying the chemically determined value for nitrogen by the factor 6.25 ($N \times 6.25$).
- protein efficiency ratio (PER)** The weight gained by growing experimental animals divided by the weight of the protein consumed, for example, the PER for casein is 2.5 (i.e., for each 1 g of casein ingested, test animals gain 2.5 g in body weight). The caloric intake must be adequate and the concentration of dietary protein must be adequate but not excessive, because gain is not proportional to intake at high levels of dietary protein. Adjusted $PER = (PER \text{ of test food} \times 2.5) / (PER \text{ of standard reference casein})$.
- protein equivalent** A term indicating the total nitrogenous contribution of a substance in comparison with the nitrogen content of protein (usually plant protein). For example, the nonprotein nitrogen (NPN) compound urea contains approximately 45 percent nitrogen and has a protein equivalent of 281 percent (6.25×45 percent).
- protein-fortified** Describing low-fat and skim milks that contain at least 10 percent nonfat milk solids (NMS). When milk derivatives other than NDM are used to satisfy the 10 percent requirement, the protein added must be milk protein and must equal or exceed the quantity that would be added if the additive were NDM.
- protein supplements** Feed products that contain 20 percent or more protein.
- protozoa (protozoan)** A microscopic animal that consists of a single cell.
- proved sire** A sire whose transmitting ability has been measured by comparing the production performance of his daughters with that of the daughter's dam and/or herdmates under similar conditions. See **herdmates**.
- proximal** Nearest; closer to any point of reference; opposite to **distal**.
- proximate analysis** Also known as the *Weende analysis* (developed in 1895 at the Weende Experiment Station in Germany); used to determine the gross composition of feed.
- psychobiology** That branch of biology which considers the interactions between body and mind in the formation and functioning of personality; the scientific study of the personality function.
- psychro-** From the Greek *psychros* meaning "cold." The prefix denoting relations to cold.

- psychroenergetics** Science dealing with the effect of ambient temperature and humidity on conversion of feed into bodily heat and energy.
- psychrometer** An apparatus for measuring atmospheric moisture by the difference in readings of two thermometers (one dry bulb and one wet bulb).
- psychrometric** (adj. of psychrometry) Pertaining to the use of a hygrometer consisting essentially of two similar thermometers with the bulb of one being kept wet so that the cooling that results from evaporation makes it register a lower temperature than the dry one, and with the difference between the readings constituting a measure of the dryness of the atmosphere.
- puberty** The age at which the reproductive organs become functionally operative and secondary sex characteristics develop.
- pubic** Pertaining to the pubes (hair growing over pubic area) or pubic bones. The lower part of the hypogastric region.
- public health** An organized effort to prevent disease, prolong life, and promote physical and mental efficiency. Also, the health of the community taken as a whole.
- pudic** Pertaining to the external genital parts, especially of the female.
- pullet** A female chicken less than a year old.
- puncher** One who herds cattle; a cowboy.
- pupa** The quiescent or inactive stage during which an immature insect or larva transforms into an adult.
- pupal stage** Period in the life history of insects between the caterpillar, or grub, stage and the mature, or adult, insect.
- pupate** To change from an active immature insect into the inactive pupal stage.
- purebred** An animal of a recognized breed that is eligible for registry in the official herdbook of that breed.
- purebreeding (truebreeding)** Breeding a stock that is **homozygous** for one or more characteristics.
- pure culture** A population of microorganisms that contains only a single species. Cultures are useful in the manufacture of many animal products, e.g., cheeses and yogurt.
- purified diet** A mixture of the known essential dietary nutrients in a pure form that is fed to experimental (test) animals in nutrition studies.
- pus** A liquid inflammatory product consisting of leukocytes, lymph, bacteria, dead tissue cells, and fluid derived from their disintegration.
- putrefaction** The bacterial decomposition of proteins.
- pyrexia** A fever or febrile condition. An abnormal elevation of body temperature.

Q

- qualitative traits (qualitative inheritance)** Those traits, such as black and white or polled and horned, in which there is a sharp distinction between **phenotypes**. Usually only one or two pairs of genes are involved.
- quality** A term indicating fineness of texture as opposed to coarseness. It commonly is used to indicate relative merit, e.g., superior breeding or genetic merit.
- quantitative traits (quantitative inheritance)** Those traits, such as skin color in humans, in which there is no sharp distinction between phenotypes, with a gradual variation from one phenotype to another. Usually several genes as well as environmental factors are involved.
- quarantine** Commonly thought of as the segregation of the active case of an infectious disease, but more technically, it includes compulsory segregation of exposed susceptible animals or individuals for a period of time equal to the longest usual incubation period of the disease to which they have been exposed. A regulation under police power for the exclusion or isolation of an animal to prevent the spread of an infectious disease.

R

- rabies** An infectious viral disease of the central nervous system usually fatal in mammals. Early symptoms include fever and hyperexcitability followed by paralysis of the muscles used in swallowing, progresses to convulsions or paralysis and death.
- rack** The gait of a horse in which only one foot touches the ground at any one time, producing a four-beat gait. The legs move in lateral pairs but not quite in unison, so that each foot is lifted and put down alone.
- rad** Another name or unit for "radiation energy absorbed" by food being processed with radiation. 1000 rad = 1 kilorad = 10 **gray**; 1,000,000 rad = 1 Mrad = 10 kGy; (the rad is being superseded by the **gray**).
- radappertization** Sterilization by radiation processing. The resulting processed food can be stored at room temperature, in the same way as thermally sterilized foods (canned foods). Precooked food in hermetically sealed packaging is exposed to radiation at levels high enough to kill all organisms of food spoilage and/or of public health significance. Doses used are typically greater than 1 Mrad.
- radiant energy** Energy that is being transferred through space by electromagnetic waves.
- radiant heat** Heat transmitted by radiation (such as that of the sun) as contrasted with that transmitted by **conduction** or **convection**.
- radiation** The process of emitting radiant energy (heat) in the form of waves or particles. The sun transfers its energy by radiation. It is also an important method of heat loss from an animal to cooler objects and heat gain by the animal from warmer objects.
- radiation sterilization** The use of radiation to cause a plant or animal to become sterile or incapable of reproduction. Also, the use of radiation to kill all forms of life (especially bacteria) in food and on equipment.
- radicidation (radicidized)** Radiation pasteurization intended to kill or render harmless all *disease-causing* organisms (except viruses and spore-forming bacteria) in food. Processing takes place at dose levels generally below 1 Mrad, and the processed foods usually must be stored under refrigeration (as in heat pasteurization).
- radioactive** Of, caused by, or exhibiting radioactivity. The property possessed by some elements (as uranium) or isotopes (as carbon 14) of spontaneously emitting energetic particles.
- radioactive dating** A technique for measuring the age of an object or sample of material by determining the ratios of various **radioisotopes**, or products of radioactive decay, it contains. For example, the ratio of carbon 14 to carbon 12 reveals the approximate age of bones, pieces of wood, or other archaeological specimens that contain carbon extracted from the air at the time of their origin.

radioactive isotope An element of chemical character with radioactive properties. Such isotopes are produced by bombarding the element in a cyclotron. Especially important ones include those of carbon, iodine, iron, phosphorus, and sulfur; useful in medical and nutritional research.

radiograph A record or photograph produced by **X rays** or other rays on a photographic plate, commonly called an *X-ray picture*.

radioisotope A radioactive isotope (the nucleus of such a species of atom). A nuclide. Such isotopes occur naturally and may also be produced by bombardment of a common chemical element with high-velocity particles. A radioactive isotope transmutes into another element with emission of electromagnetic **particles**. More than 1300 natural and artificial radioisotopes have been identified.

radiology The science that deals with the use of all forms of ionizing radiation in the diagnosis and therapy of disease.

radurization Radiation pasteurization designed to kill or inactivate *food-spoilage* organisms, thus extending the shelf life of a given food product. Processing takes place at dose levels generally below 1 Mrad, and the product usually must be stored under refrigeration, as in the case of **radicidized** food.

ram A male sheep. Also called a **buck**.

ram test station A testing farm or facility where ram lambs are managed to compare their performance in growth and carcass traits.

random All possible samples have equal probability of selection.

random mating A system of mating where every male has an equal chance of mating with every female.

range Large, open areas of grazing land.

rangy Designating an animal that is long, lean, leggy, and not too muscular.

rate Synonymous with *level, dosage, amount, quantity, or degree* measured in proportion to something else.

rate of passage The time taken by undigested residues from a given meal to reach the feces. A stained undigestible material is commonly used to estimate rate of passage.

ration The food allowed an animal for 24 h. A *balanced* ration provides all the nutrients required to nourish an animal for 24 h. See **balanced ration**.

rawhide The usual American name, which has spread to other English-speaking countries, for cattlehide that has been dehaired but is usually unfinished. Some rawhide is tanned with the hair left on. It is used principally for mechanical purposes, such as belt facings and pins, gaskets, pinions and gears, and also for trunk binding and luggage.

raw milk Fresh, untreated milk as it comes from the cow or another mammal.

raw wool Wool prior to removal of the grease.

razorback A type of hog with long legs and snout, sharp narrow back, and lean body; usually a half-wild mongrel breed (especially of the southern United States).

reactor An animal that reacts positively to a foreign substance; e.g., a tuberculous animal would be a reactor to **tuberculin**.

recessive Expressed only if the responsible **allele** is present on both members of a pair of **homologous chromosomes**. A recessive **allele** which is masked by a dominant allele is expressed only in the **homozygous** state.

recessive gene A gene whose phenotypic expression is covered

(masked) by its own dominant allele. For example, the blue-eyed gene *b* is recessive to the brown-eyed gene *B*, with *Bb* individuals having brown eyes. A *bb* individual would have blue eyes.

Recessive genes appear to affect the phenotype only when present in a **homozygous** condition.

recombination A formation of genotypes and phenotypes that are new combinations of the parents in a given cross.

reconstituted milk The product that results from the recombining of milk fat and nonfat dry milk or dried whole milk with water in proportions to yield the constituent percentage occurring in milk.

red meat Meat that is red when raw. Red meat includes beef, veal, pork, mutton, and lamb.

redia A larval stage in the development of flukes. Redia of liver flukes of cattle, sheep, and goats are found in snails.

reduction Chemically, the subtraction of oxygen from, or the addition of hydrogen to, a substance (or the loss of positive charges or the gain of negative charges). The atom or groups of atoms that lose electrons become oxidized.

reflectivity The ratio of the rate of reflection of radiant energy from a given surface to the rate of incidence of radiant energy on it.

reflex Action performed involuntarily in consequence of a nervous impulse transmitted from a receptor, or sense organ, to a nerve center.

regurgitation (regurgitate) The casting up (backward flow) of undigested food from the stomach to the mouth, as by ruminants.

relative humidity (RH) The ratio of the weight of water vapor contained in a given volume of air to the weight that the same volume of air would contain when saturated. The quantity of water vapor that air can hold when saturated increases with temperature. The RH is expressed as a percentage. For example, if a sample of air at a given temperature contains 30 percent of the water vapor that it is possible for it to contain at that temperature, it is 30 percent saturated and therefore has a relative humidity of 30 percent.

replacement Animals destined to become members of the breeding herd or flock by replacing animals culled from the unit.

reservoir host (reservoir) An animal that harbors the same species of parasite as humans. Also an animal that becomes infected and serves as a source from which other animals can be infected.

respiratory quotient (RQ) The RQ is used to indicate the *type* of food being metabolized. This is possible because carbohydrates, fats, and proteins differ in the relative amounts of oxygen and carbon contained in their molecules. Also, the relative volumes of oxygen consumed and carbon dioxide produced during metabolism of each type of food vary. Respiratory quotient is calculated as follows:

$$RQ = \frac{\text{volume CO}_2 \text{ produced}}{\text{volume O}_2 \text{ consumed}}$$

response category Class of homeokinetic response by an animal to an environmental stimulus.

retained placenta A placenta that was not expelled at parturition.

reticuloendothelial system A widely spread network of body cells concerned with blood cell formation, bile formation, and engulfing or trapping of foreign materials, which includes cells of bone marrow, lymph, spleen, and liver. Currently the preferred terminology is the monocyte-macrophage system.

reticulum The second division of the stomach of a ruminant animal. Also called *honeycomb*.

retrogression Degeneration, deterioration, or a backward movement.

reversion Appearance of a trait in an individual that was possessed by remote ancestors but not by recent ones.

rhinovirus An infectious viral disease affecting the respiratory system resulting in sneezing, coughing, fever, and depression; some strains also result in fetal death and abortion.

rickettsiae Intracellular parasites, i.e., ones that multiply inside the living cells of other larger organisms. In size they are intermediate between bacteria and viruses.

ride To mount and travel on a horse. To mount a cow, as another cow, indicative of **estrus (heat)**. See **buller**.

ridder An animal that rides another of its kind, as when young bulls or boars ride other young bulls or boars. See **buller**.

ridgling Any male animal whose testicles fail to descend normally into the scrotum. Also called **cyptorchid**.

rights Something due an entity (e. g., a human or an animal) by virtue of nature, tradition, or law.

rights strategy Belief that the value of an entity or action is determined by rights.

rigling A male sheep or horse that has only one testicle in the scrotum. See **ridgling**.

rigor mortis The stiffness of body muscles that is observed shortly after the death of an animal. It is caused by an accumulation of **metabolic** products, especially lactic acid, in the muscles.

ring test A test for brucellosis performed by mixing stained *Brucella* bacteria with **raw milk**. If **antibodies** to *Brucella* are present, the stained cells **agglutinate** (clump) and rise to the surface with the cream to form a blue ring.

RNA Ribonucleic acid.

roan Designating the red-white color of Shorthorn cattle. Red or black coat color of a horse intermingled with white; may be red or strawberry roan, blue roan, or chestnut roan, depending on the intermingling of the background colors.

roaster A young chicken (meat type) weighing more than 3.5 lb (and usually 4 to 6 months old).

roasting pig A pig weighing from 15 to 50 lb.

robot A device that automatically performs repetitive tasks. For example, an automated milking system that utilizes electronic sensors and computer systems to milk cows. A cow enters a stall equipped with the automated system and the machinery functions under computer control to attach the milking machine to the cow, complete milking, and then detach milking machine from the cow.

rodent A classification of mammals, mostly vegetarians, characterized by their single pair of chisel-shaped, upper incisors (rabbits, rats, mice, squirrels).

rodenticide Any poison that is lethal to rodents.

roe The eggs or testes of fish. There are two types: the female eggs (hard roe) and the male testes (soft roe). They are considered a delicacy by many people.

roost A resting or lodging place for fowls.

rooster (cock) An adult male chicken.

roosting Pertains to a group of winged animals settling down for rest or sleep, as in birds roosting together.

rotation Crossbreeding system where sire breeds are used in a manner in which the daughters of a sire breed are mated to the next sire breed in a cycle (or rotation) for as many generations as

there are breeds in the rotation at which time the sequence of sire breeds begins a new cycle (e.g., the planned use of three or more breeds in a rotational breeding program in swine).

roughage Consists of pasture, **silage**, hay, or other dry **fodder**. It may be of high or low quality. Roughages are usually high in crude fiber (more than 18 percent) and relatively low in **NFE** (approximately 40 percent).

rugged Refers to a large, strong animal.

rumen The first stomach compartment of a ruminant; also called *paunch*. The rumen is a large nutrient-producing fermentation vat that contains an amount of feed and water equal to approximately one-seventh the mature ruminant's body weight.

rumen flora The microorganisms of the rumen.

ruminant One of the order of animals that has a stomach with four complete cavities—rumen, reticulum, omasum, abomasum—through which food passes in digestion. These animals chew their cud; they include cattle, sheep, goats, deer, antelopes, elk, and camels.

ruminant See **ruminant**.

ruminant The casting up of food (cud) to be chewed a second time, as in cattle. A chewing of the cud, as by ruminants.

running horse Any race horse (e.g., a Thoroughbred).

run on To graze or pasture on, as for cattle to run on the range.

runt A term commonly used to denote a piglet of small size in relation to its littermates. Runts usually result from a shortage of milk in one or more teats of the sow.

rupture The forcible tearing or breaking of a body part. Also used to refer to a defect in the body wall. See **hernia**.

rustle To hunt for food, especially with reference to domestic animals fed inadequately by their manager/owner. To steal livestock.

S

sagittal Anteroposterior plane or section parallel to the long axis of the body.

salmonid Fishes related to salmon and trout.

salpingitis An inflammation of a fallopian tube (oviduct).

saprophyte Any vegetative organism, such as a bacterium, living on dead or decaying organic matter.

satiety Full satisfaction of desire; may refer to satisfaction of sexual arousal, appetite.

saturated fat A completely hydrogenated fat; that is, each carbon atom is associated with the maximum number of hydrogen atoms.

saturated fatty acid A carboxylic acid in which all of the carbons in the chain are separated by a single bond. Fatty acids are completely hydrogenated (i.e., each carbon atom is associated with the maximum number of hydrogen atoms). Palmitic and stearic acids are examples.

saturates Molecules that contain no double bonds within their carbon chains.

scale The size of an animal.

schistosomiasis Infestation with a schistosome, or blood fluke.

sclera The tough, white, supporting covering of the eyeball, which encompasses all the eyeball except the cornea.

scours A persistent diarrhea in animals.

scrub An animal inferior in breeding and/or individuality.

scurs Small, rounded portions of horn tissue attached to skin at the horn pits of polled animals; also called *buttons*.

SDA (specific dynamic action) The increased production of heat by the body as a result of a stimulus to metabolic activity caused by ingesting food.

SE See **starch equivalent**.

seasonally polyestrous Describes the tendency of some species, or some breeds within species, to have multiple estrous cycles primarily during only one season of the year. For example, ewes of the Dorset breed cycle primarily in the fall months.

sebum The thick, semifluid substance composed of **lipids** and epithelial debris secreted by the sebaceous glands.

secondary infection Infection following an infection already established by other organisms.

second filial generation See **F₂ generation**.

second meiotic division The second of two divisions occurring in reductional cell division and resulting in the production of two cells, each of which is haploid, the chromosomes occurring singly (nonpaired).

seed tick The newly hatched six-legged larva of a tick, especially of the cattle tick *Boophilis annulatus*, a one-host tick in which the larva, the nymph, and the adult are all found on cattle. Newly hatched larvae are found on the ground or on grass, weeds, and other objects in fields where infested cattle have grazed.

segregate In animal genetics, segregation is the separation of the two genes of a pair in the process of maturation so that only one goes to each germ cell.

segregated early weaning (SEW) Removing piglets from their dam and separating them from all but other early weaned pigs in biosecure facilities in order to reduce transmission of disease to the piglets from other members of the swine herd.

segregation of genes This refers to the occurrence of genes in pairs in body cells, for example, *Aa*. However, when such an individual produces **gametes**, only one of these genes, either *A* or *a*, not both, goes into a single sex cell. Thus, although they are together in body cells, they segregate, or separate from each other, when gametes are formed.

selection (selective, selected) The causing or allowing of certain individuals in a population to produce the next generation. *Artificial selection* is that practiced by humans; *natural selection* is that practiced by nature.

self-feeding Any feeding device by means of which animals can eat at will. See *ad libitum*.

senescence The process or condition of growing old. Aging. (See Chapter 12.)

sensible Perceptible; as sensible heat loss (water) or weight loss (liquids or solids).

sensory Pertaining to sensation. The eyes and ears are *sensory organs*. *Sensory nerves* convey impulses from the sense organs to a nerve center. Thus some nerves are *sensory* and pick up sensations from sense organs and carry them to main cords and the brain, whereas others are *motor* and carry impulses from the brain and main nerves to the muscles, which respond to the stimulation.

sentience Ability to consciously experience or feel an internal or external event.

sentient experiences Condition of an animal's having consciously felt an internal or external event.

septicemia Blood poisoning which results from the presence of toxins or poisons of microorganisms in the blood.

serological Pertaining to the use of blood serum of animals in various tests, which aids in detecting and treating certain diseases.

serotype The type of microorganism as determined by the kind and combination of constituent antigens associated with the cell.

serum The clear portion of animal fluids, separated from its cellular elements. Blood serum is the clear, pale-yellow, watery portion of blood that separates from the clot when blood coagulates.

serum therapy The treatment of clinical cases of disease with serum of immunized animals.

service A term used in animal breeding, denoting the mating of a male to a female. Also called *servicing*, or *covering*. (See Appendix A.)

setting hen A broody hen in the act of incubating eggs.

settled A term commonly used to indicate that the animal has become pregnant.

sex chromosomes One pair of chromosomes in an individual that determines the sex of that individual. In mammals, the female is XX and the male is XY. The X chromosome is considerably longer and carries more genes than the Y chromosome.

sex-influenced traits Such traits are due to genes carried on autosomes; however, the gene is dominant in males and recessive in females. For example, the gene for baldness, *Ba*, in humans is a sex-influenced gene. Its allele is *Bn*, for nonbaldness phenotype.

Genotype	Men	Women
<i>BaBa</i>	Bald	Bald
<i>BaBn</i>	Bald	Not bald
<i>BnBn</i>	Not bald	Not bald

sex-limited traits The appearance of such traits is limited to only one sex, for example, egg laying in hens and lactation in cows. Nevertheless, males of these species possess genes for these traits, even though they are not expressed phenotypically.

sex linkage Refers to genes carried on the nonhomologous portion of the X chromosome. For recessive sex-linked genes, two are required to express the trait in females and one in males. A gene carried on the nonhomologous portion of the Y chromosome is always transmitted from father to son. It is referred to as *holandric inheritance*. Sex-linked genes are alleles, then, that have their loci on the sex chromosomes, usually only on the X chromosomes.

sex-linked See **sex linkage**. Refers to a trait that is affected by sex linkage.

sex-linked inheritance See **sex linkage**.

shear To cut wool or hair from sheep, goats, and other wool-producing animals.

shelf life The time after processing during which a product remains suitable for human consumption, especially the time a food remains palatable and safe.

shoat (shote) A young pig of either sex less than 12 months old. (See Appendix A.)

shy breeder A male or female of any domesticated livestock that has a low reproductive efficiency.

sibling In genetics, a brother or sister.

sickle-hocked Designating a horse, cow, or sheep having a crooked hock, which causes the lower part of the leg to be bent forward out of a normal perpendicular straight line.

silage (ensilage) Prepared by chopping green **forage**, such as grass or clover, or **fodder**, such as field corn or sorghum, and blowing it

- into an airtight chamber (**silo**), where it is compressed so that air is excluded and it undergoes an acid fermentation (produces lactic and acetic acids) that retards spoiling. It usually contains 65 to 70 percent moisture.
- silo** A pit, trench, aboveground horizontal container, or vertical cylindrical structure of relatively airtight construction into which chopped green crops, such as corn, grass, legumes, or small grain and other livestock feeds are placed and allowed to partially ferment into silage. See **silage**, also.
- sinistral** Of or pertaining to the left side; left; or left-handed.
- sire** The male parent. To father or to beget.
- sire indexes** Various means of calculating the abilities of bulls to transmit economically important production traits. See also **USDA sire summary**.
- sire summary** See **USDA sire summary**.
- skewbald** A horse of any color except black, with white spots.
- slip** To abort. An incompletely castrated male.
- slow gait** One of the several forward movements, or gaits, of horses, faster than a walk but slower than a canter. There are three slow gaits: the running walk, the fox trot, and the slow pace.
- slunk** The skin of an unborn or prematurely born calf.
- smooth mouth** The mouth of a horse whose teeth have lost their natural cusps and have become smooth by use and wear, generally indicating that the horse is 10 or more years of age. (See page 114.)
- SMR** See **standard metabolic rate**.
- SNF** Solids-not fat of milk (proteins, **lactose**, and minerals). Same as **NFS** and **NMS**.
- snood** The fleshy appendage that emanates from the area of the base of the upper beak in the turkey.
- social insect** Any insect that lives with others of its kind in a somewhat organized colony, such as ants, bees, and wasps.
- sodium nitrate** A preservative used to prevent the germination of spores of *Clostridium botulinum* and to stabilize the color in cured meats. The nitrogen atom is less oxidized than that of nitrate.
- sodium nitrite** A preservative used in cured meats to complement the effect of nitrites. The nitrogen atom is more oxidized than that of nitrite.
- soft rays** The section of a fish's fins where the rays do not contain a bony rod. These cartilaginous structures provide support for the fins of fish; fins of freshwater fish have soft rays composed of cartilage and dense connective tissue while the majority of saltwater fish have hard rays composed of cartilage and bone.
- soilage** Freshly cut green forage fed to animals in confinement. Also called **green chop**.
- soiling** A term previously used for the green chopping of forages.
- soluble** Designating a substance that is capable of being dissolved in another.
- somatic** Refers to body tissues; having two sets of chromosomes.
- sorrel** A coat color of horses. It includes the red shades of chestnut or yellowish brown.
- sow** Mature female swine. (See Appendix A.)
- sowbelly** Salt pork; unsmoked fat bacon.
- space spray** Insect spray used in insect control in open spaces, e.g., in a dairy barn or hog house.
- span (spann)** A pair of animals usually harnessed together as a team.
- spay** To surgically remove the ovaries of a female.
- species** A group of animals having several common characteristics that differentiate them from others.
- specific dynamic action** See **SDA**.
- sperm** (sing. **spermatozoon**, pl. **spermatozoa**) A mature male germ cell.
- spermatogenesis** The formation and development of spermatozoa.
- SPF** Specific pathogen-free.
- sphincter** A ring-shaped muscle that closes an opening, e.g., the sphincter muscles in the lower end of a cow's teat.
- spinnbarkeit** The formation of a thread by cervical mucus when blown onto a glass slide and drawn out by a cover glass; the time at which it can be drawn to the maximum length usually precedes or coincides with the time of ovulation in women.
- splayfooted** See **toe out**.
- split hide** The outer (hair or grain) layer of a hide from which the under, or flesh, side has been split to give it a reasonably uniform thickness.
- spool joint** The exposed surface of the end of the metacarpus in the leg of a lamb carcass.
- spontaneous** Instinctive (performed apparently without the exercise of reason) and occurring without external influence.
- spore** From the Greek *spores* meaning "seed." A single cell that becomes free and is capable of developing into a new plant or animal. The reproductive element of some lower organisms. It does not contain a preformed embryo, as do seeds.
- springer** A term commonly associated with female cattle showing signs of advanced pregnancy.
- stable** A building used for the feeding and lodging of horses and other livestock.
- stable isotope** An **isotope** that does not undergo radioactive decay.
- stag** A male animal castrated after the secondary sex characteristics have developed sufficiently to give it the appearance of a normal mature male.
- stale** A period when an animal does not work or lactate at normal standards, as opposed to **bloom**.
- stallion** A mature male horse, not castrated. (See Appendix A.)
- stance** Position, or posture, adopted when an animal is stationary.
- standard metabolic rate (SMR)** Reflects an animal's basic **maintenance energy (ME)** requirement. It is useful and important in studies of thermal physiology and productive efficiency to have such a reference metabolic rate. Because metabolic rate increases during thermal stress, an animal's reference metabolic rate should be measured in the **thermoneutral zone** of effective environmental temperature. Moreover, because metabolic rate increases postfeeding (due to the **heat increment of feeding**), the reference value should be determined sometime after the animal has absorbed its last meal. Additionally, because physical activity increases metabolic rate, to be meaningful the reference value must reflect metabolic rate when the animal is resting. Thus, the SMR takes these three conditions into account and is said to occur in a fasting, resting animal held in thermoneutral surroundings. Standard metabolic rate is based on the 0.75 power of body weight, the value commonly called **metabolic body size**. By means of SMR, comparisons can be made among animals of different sizes and species. In human physiology, SMR is called basal metabolic rate (BMR) (see **basal metabolism**). In animal science literature, standard metabolic rate is synonymous with *fasting metabolic rate* and with *resting metabolic rate*.

starch equivalent (SE) A net-energy system of feed evaluation that is used extensively in Germany and other European countries. One kilogram of SE is equivalent to 2356 kcal net energy for fattening (NE_F). The system is based on research by Kellner and his successors. SE values are calculated on the basis of digestible nutrients and crude fiber of the diet.

starvation The deprivation of an animal of any or all the food elements necessary to its nutrition, health, and well-being.

state of being State of an animal's conditions of life. (See Chapter 7.)

steer A male bovine castrated before the development of secondary sex characteristics. (See Appendix A.)

sterility Barrenness; inability to produce young.

sterilization The process of killing or removing *all* living organisms from a substance or an article.

sterilize To remove or kill all living organisms. To render an animal infertile.

sterol Any of a group of high-molecular-weight alcohols, as ergosterol and cholesterol.

stillborn Born lifeless; dead at birth.

stocker (stock cattle) Commonly young **steers** or cows that are light weight, thin, and lack **finish**. Also refers to growing animals fed relatively inexpensive, lower energy feeds (such as corn **stover** or late season pastures) to put on a lean but lower-cost weight gain.

stool Fecal material; evacuation from the digestive tract.

stover Fodder; mature, cured stalks of grain from which the seeds have been removed such as stalks of corn without ears.

straggler An animal that strays or wanders from a herd or flock.

strain A group of animals within a breed differing in one or more characteristics from other members of the breed.

stress The sum of all nonspecific biological phenomena caused by adverse conditions or influences. It includes physical, chemical, and/or emotional factors to which an individual fails to make satisfactory adaptation which results in physiological tensions that may contribute to disease and/or poor performance.

stress responses The homeokinetic response by an animal to an environmental stimulus which is inadequate to compensate for that environmental impingement.

stride The distance from one footprint of a horse to the print of the same foot when it next comes fully to the ground.

strobilation An asexual form of reproduction in which segments of the body separate to form new individuals, as in tapeworms.

stud A unit of selected animals kept for breeding purposes, as of bulls and horses. Abbreviation for *stud horse*: a stallion. In artificial insemination, a **stud** refers to a semen-producing business in which any individual or business entity owns or leases one or more boars, bulls, stallions, or males of other species from which the individual or business entity collects, processes, and distributes semen for use in the insemination of animals owned by others. The stud is maintained as a service and a "for profit" enterprise.

sty A pen in which swine are fed and housed.

subclinical A disease condition without clinical manifestations.

subcutaneous (subcutaneously) Situated or occurring beneath the skin.

sublimation The process of sublimating or subliming; the direct transition from solid to vapor (bypassing the liquid form). The process of vaporizing and condensing a solid substance without melting it.

substrate A substance on which cells or organisms may live and be nourished.

succulence A condition of plants characterized by juiciness, freshness, and tenderness, making them appetizing to animals.

suckle To nurse at the breast or mammary glands.

suckling A young, unweaned animal.

suede finish A finish produced by running the surface of leather on an abrasive to separate the fibers in order to give the leather a velvetlike nap. The term denotes a finish, not a type of leather.

suffering See **animal suffering**.

superfetation Second impregnation of a female that is already pregnant.

superovulation The use of follicle-stimulating hormone (FSH) or fertility drugs to superstimulate follicular development so more than the normal number of follicles mature and ovulate (rupture and release eggs). These ova can be fertilized *in vivo* (within the uterus) or *in vitro* (e.g., in a test tube) before being transferred to the recipient female(s) or being frozen for future transfer.

supplement (supplemental) Refers to the addition of minerals, vitamins, or other minor ingredients (bulkwise) to a diet.

supra- A prefix meaning on, above, over, or beyond.

swarm The simultaneous emergence or assembly in one location of large numbers of insects (especially bees), often to establish a new colony.

sweet butter Unsalted butter.

swirl Hair that grows in a whorl on an animal.

switch The brush of hair on the end of a bovine tail.

symbiosis The living together in intimate association of two dissimilar organisms, with a resulting mutual benefit.

symbiotic (adj. of **symbiosis**) Associated in *symbiosis*; living together in a mutually beneficial relationship.

synapsis The pairing of a homologous set of chromosomes during the first meiotic division. The chromosomes occur as paired chromatids joined at the centromere.

syndrome A group of signs and symptoms that occur together and characterize a disease; a disturbance or abnormality.

syngamy Fusion of identical **gametes**.

synovia (synovial fluid) A viscid fluid containing synovin, or mucin, and a small proportion of mineral salts. It is secreted by the synovial membrane and resembles the white of an egg. It is contained in joint cavities, bursae, and tendon sheaths.

T

tachycardia Excessive rapidity in the action of the heart (pulse rate above 100/min in humans).

tack Riding equipment, such as the bridle and saddle. Also refers to equipment used in the fitting and showing of animals.

tactile Pertaining to the touch.

tag See **tracer isotope**.

take To accept a male in coitus. To result in a mild infection after vaccination.

tallow The fat extracted from adipose tissue of cattle and sheep.

tanbark trail A term commonly associated with those who exhibit animals in competition at fairs and shows. *Tanbark* is the bark of several trees (e.g., oak, chestnut) used as a ground covering in circus lots, racetracks, livestock pavilions.

tankage A **protein supplement** used as an animal feed. It consists of ground meat and bone by-products of animals that have been slaughtered.

- tanning** The processing of perishable rawhides and skins into the permanent and durable form of leather by the use of tanning materials.
- TDN** See **total digestible nutrients**.
- teart** Molybdenosis of farm animals caused by feeding on vegetation grown on soil that contains high levels of molybdenum.
- tease** To stimulate an animal to accept coitus (e.g., in horses).
- teg** A sheep 2 years of age.
- telophase** The fourth stage of mitosis, characterized by elongation of chromosomes, disappearance of spindle fibers, and reorganization of nuclear membrane.
- temperament** Disposition of an animal.
- tend** To care for, as a flock of sheep.
- tendon** The strong tissue terminating a muscle and attached to a bone, affording leverage.
- term** The gestation period of domestic mammals.
- test cross** Mating involving a recessive phenotype; used to determine heterozygosity of a stock.
- tetany** A condition in an animal in which there are spasmodic muscular contractions.
- tether** To tie an animal with a rope or chain to allow grazing but prevent straying.
- tetrad** A unit of four chromatids formed as a result of synapsis of homologous chromosomes, each of which consists of a pair of identical chromatids joined at the centromere.
- therapeutic** Curative, used in healing.
- therapeutically** Used for a curative purpose (as in the treatment of a medical disorder).
- therapy** The treatment of disease. Curative.
- therm** See **megacalorie**.
- thermal elements** Include temperature, humidity, air movement, and radiant heat.
- thermocouple** A device consisting essentially of two conductors made of different metals, joined at both ends, producing a loop in which an electric current will flow when there is a difference in temperature between the two junctions.
- thermogenesis** The chemical production of heat in the body.
- thermolysis** The loss or dissipation of body heat.
- thermoneutrality** The state of thermal balance between an organism and its environment so that the body thermoregulatory mechanisms are inactive. The **thermoneutral zone** is also referred to as the **comfort zone**.
- thermoneutral zone** The relatively narrow zone of effective environmental temperature in which heat production at the animal's minimal or thermoneutral rate is offset by net heat loss to the environment without the aid of special heat-conserving or heat-dissipating mechanisms. Thus, the animal is under neither cold nor heat stress. See also **comfort zone**.
- thorax** The chest.
- Thoroughbred** The name of the English breed of running horses.
- three-breeding** See **three-way cross**.
- three-way cross** The practice of crossbreeding food-producing animals (e.g., swine) where three breeds are crossed to increase the amount of **hybrid vigor** that is expressed. A system of **rotation** breeding involving males of three different breeds.
- threshold** The level or point at which a physiological effect becomes evident as a result of stimulation.
- throw** To cause an animal, as a horse or cow, to fall to the ground before branding or treating. To abort an embryo or fetus.
- thumps** An animal ailment resembling hiccups in humans that is seen, for example, in anemic baby pigs.
- thymus** Glandlike organ in the upper part of the chest that reaches its maximum development during late childhood in humans. It is associated with immune function.
- thyroid** Gland in the neck that helps regulate many processes of growth and development.
- tick** Any of the various bloodsucking arachnids that fasten themselves to warm-blooded animals. Some are important **vectors** of diseases.
- titer** The quantity of a substance required to produce a reaction with a given volume of another substance, or the amount of one substance required to correspond to a given amount of another substance. *Agglutination titer* is the highest dilution of a serum that causes clumping of bacteria.
- tobiano** A color pattern of Pinto horses. The horse appears to be white with large spots of color often overlapping on the chest, flank, and buttock; legs are generally white.
- toe out** To walk with the feet pointed outward. Also called *splayfooted* or *slew-footed*.
- tom** A male turkey. (See Appendix A.)
- tonicity** The state of tension or partial contraction of muscle fibers while at rest; normal condition of muscle tone.
- total digestible nutrients (TDN)** A standard evaluation of the usefulness of a particular feed for farm animals that includes all the digestible organic nutrients: protein, fiber, nitrogen-free extract, and fat.
- toxemia** Generalized blood poisoning, especially a form in which the toxins produced by pathogenic bacteria enter the bloodstream from a local lesion and are distributed throughout the body.
- toxins** Poisons produced by certain microorganisms. They are products of cell metabolism. The symptoms of diseases caused by bacteria, such as diphtheria and tetanus, are due to toxins.
- toxoid** A detoxified toxin. It retains the ability to stimulate formation of antitoxin in an animal's body. The discovery that toxin treated with formalin loses its toxicity is the basis for preventive immunization against such diseases as diphtheria and tetanus.
- tracer isotope** An isotope of an element, a small amount of which may be incorporated into a sample of material (the carrier) to follow (trace) the course of that element through a chemical, biological, or physical process and thus also follow the larger sample. The tracer may be radioactive, in which case observations are made by measuring the radioactivity. Tracers are also called *labels* or *tags*, and materials are said to be labeled or tagged when radioactive tracers are incorporated in them.
- trachea** The windpipe; in mammals it extends from the throat to the bronchi.
- transduction** The transfer of genetic material from one cell to another when mediated by a bacteriophage.
- transgenic animal** An animal into which cloned genetic material has been transferred; created artificially from two or more sources and incorporated into a single recombinant molecule.
- transitory** Brief; momentary; lasting only a short time; fleeting; transient.
- translocation** The attachment of a fragment of one chromosome to another that is not homologous to it.
- translucent** Transmitting light, but diffusing it so that objects beyond are not clearly distinguished.

- Trematoda** A class of the Platyhelminthes, which includes the flukes.
- trematode** Any parasitic animal organism belonging to the class Trematoda.
- tremor** An involuntary trembling or quivering.
- trihybrid** An individual that is **heterozygous** for three pairs of alleles, such as *AaBbCc*.
- trimester** A period of 3 months.
- tripe** Beef consisting of the walls of the rumen and reticulum, used as food for people.
- triple-purpose** An early production term defining animals that were bred to optimize the output of three products, such as cattle in the early American colonies bred for structural characteristics allowing them to pull a plow or wagon while also providing significant production of meat and milk. It is generally considered that performance is not maximized for individual traits because of the emphasis placed on three different production selection criteria.
- trophoblast** The enveloping layer of cells of the early embryo that will attach the ovum to the uterine wall and supply nutrition to the embryo.
- tropism** The tendency of an organism (plant or animal) to react (turn or move) in a definite way in response to external stimuli.
- trots** A diarrheal, or abnormally loose, condition of the bowels.
- true albino** Solid white animal with pink eyes. The **homozygous** albino genes in horses may be lethal.
- tuberculin** A biological agent derived from the growth and further processing of the tubercle bacilli that is used for detection or diagnosis of tuberculosis in animals and humans.
- tup** To copulate with (a ewe).
- tush** A tooth located between the incisors and molars; the eyetooth; tusk.
- twitch** To tightly squeeze the skin on the end of a horse's nose or its underlip by means of a small rope that is twisted.
- type** The physical conformation of an animal.
- type classification** A program sponsored by breed associations whereby a registered animal's conformation may be compared with the "ideal," or "true," type of animal of that breed by an official inspector (classifier).

U

- udder** The encased group of mammary glands provided with teats or nipples, as in a cow, ewe, mare, or sow. Also called *bag*.
- UE** See **urinary energy**.
- ulceration** Development of a condition whereby substance is lost from a cutaneous or mucous surface, causing gradual disintegration and necrosis of the tissues.
- ungulate** Referring to a hooved quadruped, as a cow.
- unilateral** That which affects only one side.
- uniparous** Producing only one egg or one offspring at a time.
- unsaturated fat** A fat having one or more double bonds; not completely hydrogenated.
- unsex** To castrate a male or female.
- unthriftness** Lack of vigor, poor growth or development; the quality or state of being unthrifty or unhealthy in animals.
- unthrifty** "Not thriving"; in poor general body condition; underweight with a dull hair coat.
- urea** A nonprotein, organic, nitrogenous compound. It is made synthetically by combining ammonia and carbon dioxide.
- uremia** An accumulation of nitrogenous waste products in the blood, usually associated with kidney failure.
- urinary energy (UE)** The food energy lost through the urine.
- urogenital (genitourinary)** Pertaining to the urinary and genital tracts (including the kidneys and sex organs).
- urophygial gland** The preen gland (used by birds to waterproof their feathers). See also **oil gland**.
- USDA** United States Department of Agriculture.
- USDA sire summary** A summary of official milk production records of daughters of sires to aid in selection of the best genetic material available for breeding dairy cattle.
- USDHHS** United States Department of Health and Human Services.
- USP** United States Pharmacopeia. A unit of measurement or potency of biologicals that usually coincides with an international unit. See **IU**.
- USPHS** United States Public Health Service.
- utilitarian strategy** Belief that the value of an entity or action is determined by its utility.

V

- vaccination** From the Latin *vacca* meaning "cow." Artificial immunization. To inoculate with a mildly toxic preparation of bacteria or a virus of a specific disease to prevent or lessen the future effects of that disease. Originally done with cow serum.
- vaccine** A suspension of attenuated or killed microorganisms (bacteria, viruses, or rickettsiae) administered for the prevention, amelioration (improvement), or treatment of infectious diseases.
- vaporization** The conversion of a solid or liquid into a vapor without chemical change.
- variance** "The clay of the breeder." Variance is a statistic that describes the variation that can be seen in a trait. Without variation no genetic progress is possible, because *genetically superior* animals would not be distinguishable from *genetically inferior* ones.
- vascular** Concerning blood vessels.
- vasectomy** The surgical removal of part or all of the vas deferens. This renders a male sterile without affecting his libido.
- vasoconstriction** Constriction of blood vessels.
- vasodilation** The dilation of blood vessels resulting from stimulation by a nerve or drug or hormone.
- veal** Meat of a calf.
- vealer** Calves fed for early slaughter (usually less than 3 months old).
- vector** From the Latin *vector* meaning "carrier." An organism, such as a mosquito or tick, that transmits microorganisms that cause disease.
- venison** The edible flesh of deer.
- venom** Poisonous secretion of bees, scorpions, snakes, and certain other animals.
- ventilation rate** The volume of air exhaled per unit time.
- ventral** Denoting a position toward the abdomen or belly (lower) surface. It means the same as **anterior** in human anatomy.
- ventricular fibrillation** Very rapid uncoordinated contractions of the ventricles of the heart, resulting in the loss of synchronization

between heartbeat and pulse beat. Ventricular fibrillation often results from a severe electrical shock and leads to death.

vermicide Any substance that kills internal parasitic worms.

vessels Tubes or canals (e.g., arteries) in which body fluids are contained and conveyed or circulated such as the blood or lymph.

VFA (volatile fatty acids) Commonly used in reference to acetic, propionic, and butyric acids produced in the rumen of cattle, goats, and sheep; in the cecum of sheep; the cecum and colon of swine; the colon of the horse; and the cecum of the rabbit.

viability (viable) Ability to live.

viral vaccine A preparation of killed viruses, living attenuated viruses, or living fully virulent viruses that is administered to produce or artificially increase immunity to a particular disease. An example of a viral vaccine is a preparation containing the virus of cowpox in a form used to vaccinate humans against smallpox.

viremia An infection of the bloodstream caused by a virus.

virosis A disease caused by a **virus**.

virucide A chemical or physical agent that kills or inactivates viruses; a disinfectant.

virulence The degree of pathogenicity (ability to produce disease) of a microorganism as indicated by case fatality rates and/or its ability to invade the tissues of a host.

virulent Poisonous or harmful; deadly; of a microorganism; able to cause a disease by breaking down the protective mechanisms of a host. Fully active organisms.

virus One of a group of minute infectious agents. They are characterized by a lack of independent metabolism and by the ability to replicate only within living host cells. They include any of a group of disease-producing agents composed of protein and nucleic acid. Viruses are filterable and cause such diseases in people as rabies, poliomyelitis, chicken pox, and the common cold.

viscera The internal organs of the body, particularly in the chest and abdominal cavities, such as the heart, lungs, liver, intestines, and kidneys.

vitamins Exogenous organic catalysts (or essential components of catalysts) that perform specific and necessary functions in relatively small concentrations in an animal.

viviparous (viviparously) Producing living young (as opposed to eggs) from within the body in the manner of nearly all mammals, many reptiles, and a few fishes.

void To evacuate feces and/or urine.

volatile fatty acids See **VFA**.

W

walking horse A horse trained to do the running walk, fox trot, and canter.

wax gland A wax-secreting gland of the worker bee.

weanling A recently weaned animal.

welfare See **animal welfare**.

well-being Condition or state of an animal experiencing wellness.

wether A male sheep or goat castrated before sexual maturity. (See Appendix A.)

wheal A flat, usually circular, hard elevation of the skin, commonly accompanied by burning or itching. Its formation follows an irritation or other means of increasing the permeability of the

vascular walls of the skin (e.g., a localized allergic reaction to a bee sting).

whelp To give birth to, as by a female dog. (See Appendix A.)

wey The water and solids of milk that remain after the curd is removed (e.g., in the manufacture of cheese). It contains about 93.5 percent water and 6.5 percent lactose, protein, minerals, enzymes, water-soluble vitamins, and traces of fat.

whinny The gentle, soft cry of a horse.

WHO World Health Organization. An agency of the United Nations founded in 1948. It seeks to promote worldwide health and prevent outbreak of disease. It assists countries in strengthening public health services. It plans and coordinates international efforts to solve health problems, with special attention to malaria, tuberculosis, and venereal, viral, and parasitic diseases. It works with member countries and other health organizations to collect information on epidemics; to develop international quarantine regulations; and to standardize medical drugs, vaccines, and treatment. More than 100 countries belong to WHO, which is headquartered in Geneva, Switzerland.

whole-body counter A device used to identify and measure the radiation in the body of humans and animals; it uses heavy shielding (to keep out background radiation), ultrasensitive scintillation detectors, and electronic equipment.

whorl A swirl, or cowlick, in an animal's hair.

with calf Designating a cow that is pregnant.

wool The soft and curly hair obtained from sheep.

woolskins Sheepskins tanned with the wool on.

work A term commonly associated with the use of horses to round up and cut cattle.

wriggler The larva of a mosquito.

X

X Designates the chromosome set for sex determination.

Chromosomes occur in pairs, except for the sex chromosomes. There are two types of sex chromosomes, the X and Y. Males are XY and females are XX. Because the female can produce only ova that are X, the male sperm determines the sex of the individual at conception. The male has two kinds of sperm, X-carrying and Y-carrying. Union of the X sperm with the X ovum produces XX, a female. Union of the Y sperm with the X ovum produces XY, a male.

X rays Radiation produced when electrons in a vacuum tube are projected at very high tension and velocity to strike a metallic target. These are electromagnetic waves, but their wavelength is only about one-thousandth of that of visible light. X rays are sometimes called roentgen rays, after their discoverer, Wilhelm Roentgen. See **radiograph**.

Y

Y chromosome The differential sex chromosome carried by one-half the male gametes in humans and some other male-heterogametic species in which the homologue of the X chromosome has been retained. See also **chromosomes** and **X**.

yea To give birth to young, especially by goats and sheep.

yealing A young goat or sheep.

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yearling Refers to a male or female farm animal (especially cattle and horses) during the first year of its life.

yeld mare A dry (nonlactating) mare or a mare that has not raised a foal during a particular season.

yogurt Fermented milk, low-fat milk, or skim milk, sometimes **protein-fortified**. Milk solid content is commonly 15 percent. Most yogurt is high in protein and low in calories.

Z

Zebu A strain of cattle originating in India; widely domesticated throughout India, China, and East Africa, used as beasts of burden

and meat animals and for their milk. The Zebu has a large hump over the shoulders, pendulous ears, and a large dewlap. Also called *Brahman*.

zo- The prefix *zo-* implies *animal*.

zoonosis (pl. **zoonoses**) Those diseases and infections that are naturally transmitted between vertebrate animals and humans.

zooplankton Plankton found in any body of water that is comprised of microscopic animals that live unattached in the water. Phytoplankton serves as food for zooplankton, which are then eaten by larger fish and aquatic animals.

zygote A diploid cell produced by the union of haploid male and female **gametes**.