CHAPTER 21

VETERINARY MEDICINE

21-1. FOOD PROCUREMENT, INSPECTION, AND PREPARATION.

a. Dangers from food sources.

(1) Physical - contamination of food by arthropods, metal fragments, glass, radioactive particles, etc.

(2) Chemical - contamination of food with chemical agents, industrial chemicals, and other adulterating chemicals (zinc, copper, cadmium, pesticides, etc.).

(3) Biological - contamination of food by pathogenic microorganisms (bacteria, fungi, virus) or unacceptable levels of spoilage microorganisms.

b. Semiperishable rations (canned and dried food products). Freezing and extreme heat can change semiperishables both chemically and physically; therefore, protect rations from environmental extremes. It is necessary to periodically monitor rations for condition of product and packaging as well as for arthropod infestations. Discard moldy grain products (ergotism). Cans with swelling and/or leaking cans should not be used. Rust on cans and dented cans can be used as long as product in can is unaffected.

c. Perishables.

(1) Fresh fruits and vegetables should be procured from an inspected source; however, cooking (to 116°F.), immersing in boiling water 30 min, or 100 ppm. chlorine disinfectant solution (1 1/2 oz. of 5% bleach in 5 gallon H_2O) will destroy most pathogenic organisms.

(a) If possible, avoid night soil grown vegetables. Always wash, peel, and disinfect (or cook) if in doubt.

(b) Acid foods should not be stored or served in galvanized containers (zinc toxicosis).

(c) Edibility and nutrition of unfamiliar plants are best determined by observing their use by the native people and animals (always cook).

(2) Eggs and dairy products.

(a) Eggs should always be cooked (salmonellosis). Blood and meat spots are acceptable in eggs (not rotten or cracked).

(b) Unpasteurized dairy products must be pasteurized or boiled for at least 15 seconds (TB, Q fever, brucellosis, and other).

(3) Shellfish and fish.

(a) Cooking is essential for all seafood (hepatitis,

bacteria), and freshwater fish (tapeworm, fluke, other).

(b) Some shellfish toxins (i.e., during red tides) are heat stable; therefore, it is best to avoid all shellfish.

(c) Some saltwater fish have heat stable toxins. Judge what is toxic by what the native population eats.

(d) Seafood spoils quickly; therefore, avoid if there are off-odors, sticky or pitting flesh, sunken eyes, or scales that come off easily. Remember, local ice can contaminate the product.

(4) Meat and meat products.

(a) If cooked well (to avoid trichinosis, tapeworms, other), fresh meat from healthy animals is safe to eat. Carcass meat offers less chance of potential contamination than visceral meat and therefore is preferred as a food source.

(b) Antemortem exam. Briefly follow outline as given under Animal Health section - animal exam in paragraph 21-3b. Be attentive especially to:

1. Posture and gait; reject deformed or "down" animals.

2. State of nutrition; reject if very poor (chronic disease).

3. Reaction to environment; reject if very lethargic (ill) or hyperexcitable (rabies, tetanus).

4. Appetite, rumination, feces; reject if disease is indicated.

5. Respiratory system; reject if breathing is labored or coughing is severe.

6. Vulva, mammary gland; reject if signs of infection are noted.

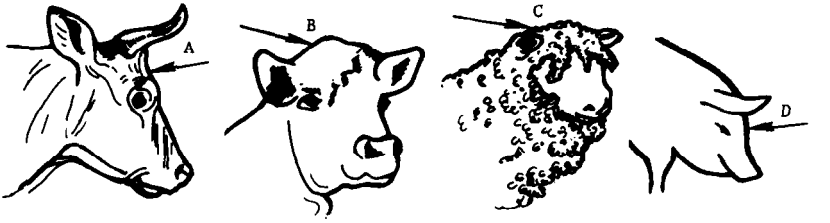
7. Hide, skin, hair; reject if there are diffuse lesions.

8. Temperature; reject if elevated (may recheck later).

NORMAL PHYSIOLOGIC VALUES

	Rectal T. (F.)	Heart rate	R. rate	Daily feces lbs.	Daily urine ml./kg.	W.B.C. x103	HCT%
Horse	100.5	23-70	12	30-50	3-18	6-12	39-52
Cow	100.5	60-70	30	30-100	17-45	4-12	24-48
Sheep	103	60-120	19	2-6.5	10-14	4-12	24-50
Goat	104	70-135			10-14	6-16	24-48
Pig	102	58-86		1-6.5	5-30	11-22	32-50
Dog	101.5	100-130	22	0-1.5	20-100	6-18	37-55
Cat	101.5	110-140	26		10-20	8-25	24-45
Rabbit	102.5	123-304					

(c) Humane slaughter, field methods, and dressing.



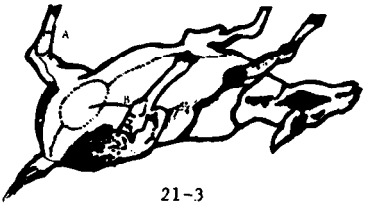
FIRING POSITION WITH HUMANE KILL.

A - Cattle B - Calves

C - Sheep D - Pigs

1. Bleed promptly; cut throat at point A. If head is to be mounted for trophy, insert knife at point B, cutting deeply until blood flows freely. In case of wound that bleeds freely or internally, bleeding may not be necessary. But it is far better to follow the sticking "ritual."

2. Remove genitals or udder. Prop carcass belly up; rocks or brush may be used for support. Cut circular area shown in illustration. Musk glands at points A and B may be removed to avoid tainting meat. Glands cease to function at time of death.



3. Split hide from tail to throat. Insert knife under skin, but do not cut into body cavity. Hide may be peeled back several inches on each side to keep hair out of meat. Cut through pelvic bone. Turning carcass downhill will cause viscera to sag into rib cavity. This will decrease chance of puncturing viscera while cutting through bone. Large intestine can then be cut free from pelvic cavity but not severed from viscera.

4. Open carcass by cutting through length of breastbone and neck into exposed windpipe. Turn carcass head uphill. Free gullet and pull viscera toward rear. An alternate method is to leave head downhill and strip viscera from rear out over the head.

(c) Postmortem exam. Should be done immediately after slaughter. Be attentive for:

1. State of nutrition; reject emaciated animals.

2. Bruising; cut off bruised area if local.

3. Swelling in joints, muscle, bones; cut out if local, reject if found in more than one body area.

4. Edema; sign of disease, reject unless localized.

5. Inflammation, adhesion, or abcessed pleura, peritoneum, or viscera; sign of septicemia--reject carcass.

6. Cut through tongue, cheek, diaphram, lung, liver, and several lymph nodes (thoracic and mesenteric lymph nodes most important) to check for parasitism and/or signs of other infections.

Caseated areas (cheeselike hardened abcesses) call for rejection (possible TB).

(5) Poultry.

(a) Antemortem. Check as in red meat with emphasis on alertness of bird, signs of respiratory problems, and level of nutrition.

(b) Slaughter by ringing neck, dislocation of neck, or beheading.

(c) Postmortem. Check eyes, gonads, and visceral organs for tumors or skin lesions. Emaciated birds may indicate TB and therefore should be rejected. Generalized inflammation or abcesses (septicemia) also warrant rejection. Also reject jaundiced birds, birds with severe arthritis, ascites, or maggots (not lice).

(d) Poultry is a potential source of salmonellosis; therefore, use fresh, refrigerate, or freeze.

21-2. STORAGE AND PRESERVATION. Storage and preservation are best accomplished by cold. Other methods include smoking, curing, making jerky and pemmican, salting and pickling, canning and using sugar solutions, and antibiotic treatment.

a. Smoking. The process of smoking meat as a means of preservation and as a taste enhancer is extremely old. Although it has largely been replaced by more modern, faster methods of food preservation, it is still a viable procedure for the SF medic in a field environment during UW operations. There are several acceptable methods, and the one outlined below should not be considered as the only safe method. There are also variations in the step-by-step instructions, depending on the type of meat. Regardless of the type of meat, there are several basics for smoking meat that do not change.

(1) No matter what type of meat is smoked, a smokehouse will be needed. This can be any type of building that has a roof vent (or have one installed), that is otherwise fairly well sealed, and that has a floor that will take a firepit. The firepit (or box) should be centered in the floor and be about 2 feet deep and 2 feet wide, depending on the amount to be cured at one time and the size of the smokehouse.

(2) The wood used for the fire should be from deciduous trees (shed leaves in winter) and preferably green. Do not use conifers (needle leaf), such as pine, firs, spruces, cedars, as the smoke these woods produce gives the meat a disagreeable taste. Start the fire and let it burn down to coals only, and then stoke it with green wood. The fire should be a "cold smoke" fire (less than 85°F.) that has only coals, not flames, during the smoking process. The meat should then be placed in the smokehouse and hung from the rafters.

(3) The rafters should be wooden poles of green wood to prevent burning and should run the length of the smokehouse. Suspension line or string may be used to connect the meat to the rafters. When hung, the bottom of the meat should be at least 4 feet but no more than 5 feet from the top of the firepit. All meat should hang free (not touching any other meat or the walls of the smokehouse) so it will smoke evenly and prevent spoilage from contact. Usually meat is smoked a minimum of 4-5 days,

depending on the size of the smokehouse and the number and size of pieces of meat being smoked. After the meat is smoked, it should be stored in the smokehouse if feasible.

(4) Preparing meat for smoking varies with the type of meat.

(a) Beef.

1. Remove the large bones, especially the joints, to prevent souring during the smoking process.

2. Trim the fat from the outer surfaces of the meat. The fat should be kept for making pemmican and candles.

3. Section the meat into manageable pieces, always cutting across the grain, not with the grain. This makes for more tender meat and helps speed up the smoking process.

4. Cut a hole in the meat and string it with heavy twine, suspension line, etc. The hole should be placed so as to prevent the string ripping through the meat during the smoking process.

5. Hang the meat in the smokehouse and fill out a smoking record. The record will enable you to follow the same procedure the next time you smoke meat.

(b) Pork.

1. Pork smoking is much like the beef process. Hot water can be used to help remove the hair from the skin of the animal.

2. Do not remove the layered fat or the bones except ball and socket joint bones. Do not scrape off the rendered fat (fat oozing from the pork during smoking).

3. Follow steps 3, 4, and 5 above.

(c) Smoked meat will generally stay in good shape for up to 1 year, depending on how well the instructions are followed, the climate, insect and rodent control, the condition of the meat prior to smoking, and other factors. If the meat should appear sour around a bone area, section the meat to expose the sour area for 24 hours. If the sour appearance clears up, the meat is generally safe. If it does not clear up, dispose of the meat. If moisture patches or small holes appear on the surface of the meat, it is going sour. If the area can be cut out and the remainder appears to be good, it can be kept. If the holes or moisture is throughout, it is ruined and must be disposed of--if in doubt, throw it out.

b. Curing. One way to keep meat fresh in conjunction with smoking is by curing it. This process works well by itself, but is best used with smoking. Various spices, sugar, salt, and brines may be used, but the method described below is a dry salt (coarse, not table) treatment. Like smoking, curing is a simple process.

(1) A work/storage area protected from insects and rodents is important in this method. The initial step is the same as step 1 in the beef smoking process. After this step has been completed, rub salt into

the meat to prepare it for the salt box (a wooden container large enough to hold the sectioned salt-covered meat). Cover the bottom of the salt box with salt. Place the salted meat in the salt box. If more than one piece of meat is placed in the box, be sure that the pieces do not touch each other. Cover the meat with salt. This procedure should be repeated in 2 days and repeated again 2 days later. The salt should be changed for each repetition. On the sixth day, remove the meat from the salt box. Place a layer of green pine straw, hay, etc., on the ground or floor (again in an area protected from rodents and insects), cover the hay with salt, and place the meat on the layer of salt. Cover the meat with salt and place a layer of straw on the salt-covered meat.

(2) The meat may be left in this manner until used or up to 1 year, depending on the same factors as for smoked meat. It should be inspected regularly.

(3) It is generally recommended that the meat be smoked. If smoking and curing are to be done, curing should be done first.

(4) When the meat is to be used (if cured), it should be washed thoroughly and inspected. Again, if in doubt as to quality, throw it out. If the meat is still very salty, soak it in water for 2-3 hours, changing the water every 30 minutes.

(5) If possible, salt should be stored in a tightly sealed container. Do not reuse the salt. If sugar or other spices are to be used as well as salt, they should be added during the "rubbing" stage while curing. If a brine is to be used, it should not be used in a wooden or metal container. For adequate preservation, the brine should be a 10% salt solution (1 lb of salt to 9 pints of water) or stronger.

c. Meat preservation records. Records should contain the following information:

(1) Type of meat prepared.

(2) Source and date the meat was obtained.

(3) Weight and cut of meat.

(4) Time cured, time smoked, as applicable.

(5) Type and amount of wood used (for smoking).

(6) Approximate temperature of smoke.

(7) Type and amount of salt (for curing).

(8) Type and amount of seasoning, if any (for curing).

(9) Color and texture of meat when completed.

(10) Overall assessment.

d. Jerky. For field-prepared food that is light and nutritious, jerky fits the bill. Red meat (beef, venison, etc.) should be used.

(1) To prepare jerky--

(a) Trim the fat from the meat.

(b) Cut the meat with the grain of the muscle into 12-inch-long strips no more than 1 inch thick and 1/2 inch wide.

(c) Pack the meat in dry salt for 10-12 hours with each strip completely covered with salt and no contact between strips.

(d) Smoke the meat.

(2) The meat may also be sun dried (sprinkle liberally with pepper to cut down on insects and store above the insect line, 20 feet or higher) or dried over slow coals, as with smoking, also sprinkled liberally with pepper.

(3) If salt cured, wash thoroughly before eating.

e. Pemmican. Pemmican is also light and nutritious and can be made in the field. The two basic ingredients needed are lean meat--sun, wind, or smoke-dried (not salt-cured)--and rendered fat.

(1) Render fat by placing ground-up (preferred) or cut-up fat into a container. Boil the fat and pour off the tallow to use in pemmican. (Tallow can also be used to make candles.) The fat residue, called cracklings, can be eaten. One ounce of beef cracklings provides 207 calories; one ounce of pork cracklings, 219 calories.

(2) You need about 6 pounds of meat to make about 1 pound of pemmican.

(a) Dry, pound, and shred the meat.

(b) Prepare a casing, such as an intestine, by cleaning and tying one end.

(c) Lightly place (do not pack) the shredded meat in the casing.

(d) Pour hot tallow into the casing, heating the meat and filling the bag. The mixture in the casing should be about 60% fat (tallow) and 40% meat.

(e) Seal (sew or tie) the casing, then seal further by pouring tallow on the sealing.

(f) Allow the pemmican to harden.

(3) Pemmican will stay safe for consumption for approximately 5 years, depending on the type of tallow used.

f. Salting and pickling. Dry salt meat or immerse in a salt solution. Use 10:1 table salt and saltpeter (potassium nitrate) for both. With pickling, mix 50 pounds of salt and 5 pounds of saltpeter with 20 gallons of water.

g. Canning. Heat is used to destroy harmful microorganisms but this is not as good as above since thermophilic bacteria may remain stable. Canning is better with fresh fruit and vegetables.

h. Sugar solutions and antibiotic treatment of meat is suggested for preservation, but again this process is not as effective as those listed above.

21-3. ANIMAL HEALTH.

a. The association of men and animals may be viewed as threefold: Animals are often intimately associated with man's livelihood, such as work or food animals; they often have religious significance or are companions; and they have diseases that can be transmitted to man. With reference to animal health, consider the following:

(1) Animal care may reduce zoonotic reservoiring of human disease, increase food production capabilities, and in general increase the standard of living of the people concerned.

(2) Treating animals or advising on animal husbandry gains rapport and shows a caring attitude.

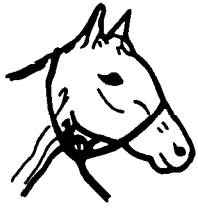
(3) Veterinary care with immediate observable results is best for short-term operations.

(4) Programs with distant goals must be approached with an appreciation for what is acceptable to the local population.

b. Animal examination: Approach the exam as you would with humans except use adequate caution and restraint.

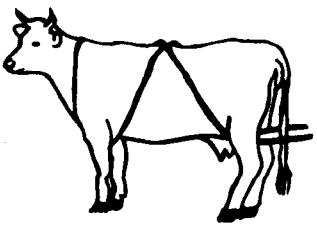
(1) Allow owner and/or native population to handle and restrain the animal as much as possible. Restraint is probably the most difficult part of treating large animals. Following are a few simple methods of restraint that may be helpful. A rappelling rope may be used.

(a) Temporary rope halter (horse or cow). Fasten a rope loop around the animal's neck with a bowline knot. Pull a bight of the standing part of the rope through the loop from rear to front and place it over the animal's nose. Pull tight when in use.



(b) Twitch (horse). A twitch is a small loop of rope or smooth chain twisted tightly around the upper lip of the horse to divert its attention while less painful work is being done on some other part of the body. A metal ring or rod or a stick may be used as a handle to wind-tighten the rope loop on the animal's nose.

(c) Burley method of casting (cow). Use approx 40 ft



of rope with the center of the rope over withers. Place the rest of rope as pictured above. While the cow is being held by a strong halter at the head, pull the ends of the rope and the cow will fall. To tie the rear legs, keep both ropes taut and slide the uppermost one along the undersurface of the rear leg to the fetlock. Flex the leg and make a half hitch around the fetlock. Then carry end around the leg and above the hock, across the cannon bone and back around the fetlock. Tie the leg with several such figure "8s."

TYING THE COW AFTER CASTING.

Tying all four feet together is a good method of restraining after the animal has been cast. A rope is tied to one leg below the fetlock. The other legs are tied to this one alternately, first a front leg, then a rear one, etc.

(d) Strap hobble (horse). A strap with a "D" ring may be used to raise one foreleg. The leg is bent at the knee and the pastern is brought towards the upper arm. The strap is placed around the arm and pastern, and the end of the strap is brought through the "D" ring, pulled tight, and secured with a half hitch.

(e) Tail restraint (cow). The tail of a cow may be bent up sharply at the base, by an assistant, when it becomes necessary to distract its attention from another part of the body. Keep both hands at the base of the tail (grasping it like a baseball bat) to avoid breaking the tail. Stand to the side to avoid being kicked.

(2) SOAP approach to animal exam.

S. Subjective - use HAAA SEMAN LHL.

1. H - history - individual and herd.

2. AAA - activity, attitude, appetite.

3. S - skin - lesions, color, texture, state of hydration.

4. E - eye, ear, nose, and throat - look in the mouth if possible.

5. M - musculoskeletal system - palpate legs; watch the animal move.

6. A - abdomen - palpate, auscultate.

7. N - neurologic exam - coordination, cranial nerves, segmental reflexes.

8. L - lungs - auscultate, rate, dyspnea.

9. H - heart - auscultate, rate.

10. L - lymph nodes - palpate submandibular, cervical and prescapular, inguinal and popliteals.

O. Objective - use VUFL.

1. V - vital signs - see normal values (Antemortem Exam).

2. U - urinalysis - odor, color, pH, sp.gr., bacteria, etc.

3. F - fecal exam - blood, excessive mucous, diarrhea, parasites, etc.

4. L - other lab data - blood count, serology, etc.

A. Assessment - use DAMN - IT.

1. D - degenerative disease.

2. A - anomaly/allergic disorder.

3. M - metabolic disorder.

4. N - nutritional/neoplastic disorder.

5. I - infection/infestation.

6. T - traumatic/toxicosis.

P. Plan - use TAEP.

1. T - treat, if feasible (with allergies, malnutrition, infections, infestations, and trauma/toxins).

2. A - advise (nutrition, culling of carriers, animal husbandry practice).

3. E - education (on herd health, preventive medical actions that the owner or community can take themselves).

4. P - public health (zoonosis potential in animals, human nutrition from animal protein source).

c. Remember that the types of diseases of animals fit the same categories as those of humans; therefore, without detailed instruction in veterinary medicine, one can only make a diagnosis on his level of knowledge. Seek advice if needed and use the Merck Veterinary Manual if one is available on specific diseases.

CHAPTER 22

PRIMITIVE MEDICINE

22-1. GENERAL.

a. This chapter covers a number of primitive treatments using materials that are found worldwide. It does not cover herbal medicines because specific herbs (plants) are difficult to identify and some are found only in specific areas of the world. This does not mean, however, that they should not be used. To get information concerning types and uses of herbal medicines in a particular area, talk to the natives. But remember, it is preventive medicine (PM) that must be stressed. Proper hygiene, care in preparation of food and drink, waste disposal, insect and rodent control, and a good immunization program can greatly reduce the causes and number of diseases.

b. All of us--patients and doctors alike--depend upon wonder drugs, fine laboratories, and modern equipment. We have lost sight of the "country doctor" type of medicine--determination, common sense, and a few primitive treatments that can be lifesaving. Many areas of the world still depend on the practices of the local witch doctor or healer. And many herbs (plants) and treatments that they use are as effective as the most modern medications available. Herbal medicine has been practiced worldwide since before recorded history, and many modern medications come from refined herbs. For example, pectin can be obtained from the rinds (white stringy part) of citrus fruits and from apple pomace (the pulp left after the juice has been pressed out). If either is mixed with ground chalk, the result will be a primitive form of Kaopectate.

c. Although many herbal medicines and exotic treatments are effective, use them with extreme caution and only when faced with limited or nonexistent medical supplies. Some are dangerous and, instead of treating the disease or injury, may cause further damage or even death.

22-2. PRIMITIVE TREATMENTS.

a. Diarrhea is a common, debilitating ailment that can be caused by almost anything. Most cases can be avoided by following good PM practices. Treatment in many cases is fluids only for 24 hours. If that does not work and no antidiarrheal medication is available, grind chalk, charcoal, or dried bones into a powder. Mix one handful of powder with treated water and administer every 2 hours until diarrhea has slowed or stopped. Adding an equal portion of apple pomace or the rinds of citrus fruit to this mixture makes the mixture more effective. Tannic acid, which is found in tea, can also help control diarrhea. Prepare a strong solution of tea, if available, and administer 1 cup every 2 hours until diarrhea slows or stops. The inner bark of hardwood trees also contains tannic acid. Boil the inner bark for 2 hours or more to release the tannic acid. The resultant black brew has a vile taste and smell, but it will stop most cases of diarrhea.

b. Worms and intestinal parasites. Infestations can usually be avoided by maintaining strict preventive medicine measures. For example, never go barefooted. The following home remedies appear to work or at least control the degree of infestation, but they are not without danger. Most work on the principle of changing the environment of the gastrointestinal tract.

(1) Salt water. Four tablespoons of salt in 1 quart of water. This should be taken on a one time basis only.

(2) Tobacco. Eat 1 to 1 1/2 cigarettes. The nicotine in the cigarette kills or stuns the worms long enough for them to be passed. If the infestation is severe, the treatment can be repeated in 24 to 48 hours, but no sooner.

(3) Kerosene. Drink 2 tablespoons. Don't drink more. The treatment can be repeated in 24 to 48 hours, but no sooner.

(4) Hot peppers. Put peppers in soups, rice, meat dishes or eat them raw. This treatment is not effective unless peppers are made a steady part of the diet.

c. Sore throats are common and usually can be taken care of by gargling with warm salt water. If the tongue is coated, scrape it off with a tooth brush, a clean stick, or even a clean fingernail; then gargle with warm salt water.

d. Skin infections.

(1) Fungal infections. Keep the area clean and dry, and expose the area to sunlight as much as possible.

(2) Heat rash. Keep the area clean, dry, and cool. If powder is available, use it on affected area.

(3) The rule of thumb for all skin diseases is: "If it is wet, dry it, and if it is dry, wet it."

e. Burns. Soak dressings or clean rags that have been boiled for 10 minutes in tannic acid (tea or inner bark of hardwood trees), cool, and apply over the burns. This relieves the pain somewhat, seems to help speed healing, and offers some protection against infection.

f. Leaches and ticks. Apply a lit cigarette or a flaming match to the back of the leach or tick, and it will drop off. Covering it with moistened tobacco, grease, or oil will also make it drop off. Do not try to pull it off; part of the head may remain attached to the skin and cause an infection.

g. Bee, wasp, and hornet stings. Inspect the wound carefully and remove stinger if present. Apply baking soda, cold compress, mud, or coconut meat to the area. Spider, scorpion, and centipede bites can be treated the same way.

h. Chiggers. Nail polish applied over the red spots will cut off the chigger's air supply and kill it. Any variation of this, e.g., tree sap, will work.

22-3. MAGGOT THERAPY FOR WOUND DEBRIDEMENT.

a. Introducing maggots into a wound can be hazardous because the wound must be exposed to flies. Flies, because of their filthy habits, are likely to introduce bacteria into the wound, causing additional complications. Maggots will also invade live, healthy tissue when the dead tissue is gone or not readily available. Maggot invasion of healthy tissue

causes extreme pain and hemorrhage, possibly severe enough to be fatal.

b. Despite the hazards involved, maggot therapy should be considered a viable alternative when, in the absence of antibiotics, a wound becomes severely infected, does not heal, and ordinary debridement is impossible.

(1) All bandages should be removed so that the wound is exposed to circulating flies. Flies are attracted to foul or fetid odors coming from the infected wound; they will not deposit eggs on fresh, clean wounds.

(2) In order to limit further contamination of the wound by disease organisms carried by the flies, those flies attracted to the wound should not be permitted to light directly on the wound surface. Instead, their activity should be restricted to the intact skin surface along the edge of the wound. Live maggots deposited here and/or maggots hatching from eggs deposited here will find their way into the wound with less additional contamination than if the flies were allowed free access to the wound.

(3) One exposure to the flies is usually all that is necessary to insure more than enough maggots for thorough debridement of a wound. Therefore, after the flies have deposited eggs, the wound should be covered with a bandage.

(4) The bandage should be removed daily to check for maggots. If no maggots are observed in the wound within 2 days after exposure to the flies, the bandage should be removed and the wound should be re-exposed. If the wound is found to be teeming with maggots when the bandage is removed, as many as possible should be removed using forceps or some other sterilized instrument or by flushing with sterile water. Only 50-100 maggots should be allowed to remain in the wound.

(5) Once the maggots have become established in the wound, it should be covered with a bandage again, but the maggot activity should be monitored closely each day. A frothy fluid produced by the maggots will make it difficult to see them. This fluid should be "sponged out" of the wound with an absorbent cloth so that all of the maggots in the wound can be seen. Care should be taken not to remove the maggots with the fluid.

(6) The period of time necessary for maggot debridement of a wound depends on a number of factors, including the depth and extent of the wound, the part of the body affected, the number of maggots present in the wound, and the fly species involved. In a survival situation, an individual will be able to control only one of these factors--the number, and sometimes not even that; therefore, the exact time to remove the maggots cannot be given in specific numbers of hours or days. However, it can be said with certainty that the maggots should be removed immediately once they have removed all the dead tissue and before they have become established in healthy tissue. When the maggots begin feeding on normal, healthy tissue, the individual will experience an increased level of pain at the site of the wound as the maggots come into contact with "live" nerves. Bright red blood in the wound also indicates that the maggots have reached healthy tissue.

(7) The maggots should be removed by flushing the wound repeatedly with sterile water. When all the maggots have been removed, the wound should be bandaged. To insure that the wound is free of maggots, check it every 4 hours or more often for several days. Any remaining

maggots should be removed with sterilized forceps or by flushing with sterile water.

(8) Once all of the maggots have been removed, bandage the wound and treat it as any other wound. It should heal normally provided there are no further complications.

22-4. SUMMARY. The treatments discussed in this chapter are by no means all of the primitive treatments or home remedies available for use. Most people have their own home remedy for various problems. Some work, some don't. The ones presented here have been used and do work, although some can be dangerous. The lack of modern medicine does not rule out medical treatment. Common sense, determination to succeed, and advice from the natives in the area on primitive treatments can provide the solution to a medical problem. Just keep one thing in mind: "First I shall do no harm."

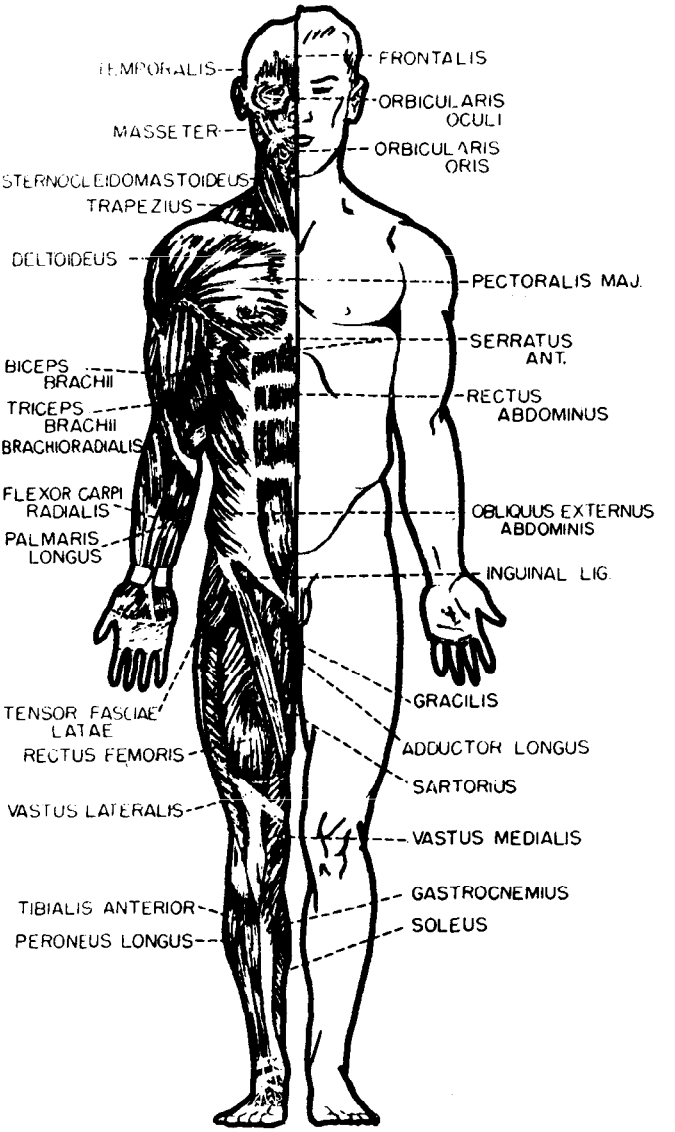


Figure 1. Important superficial muscles, anterior view.

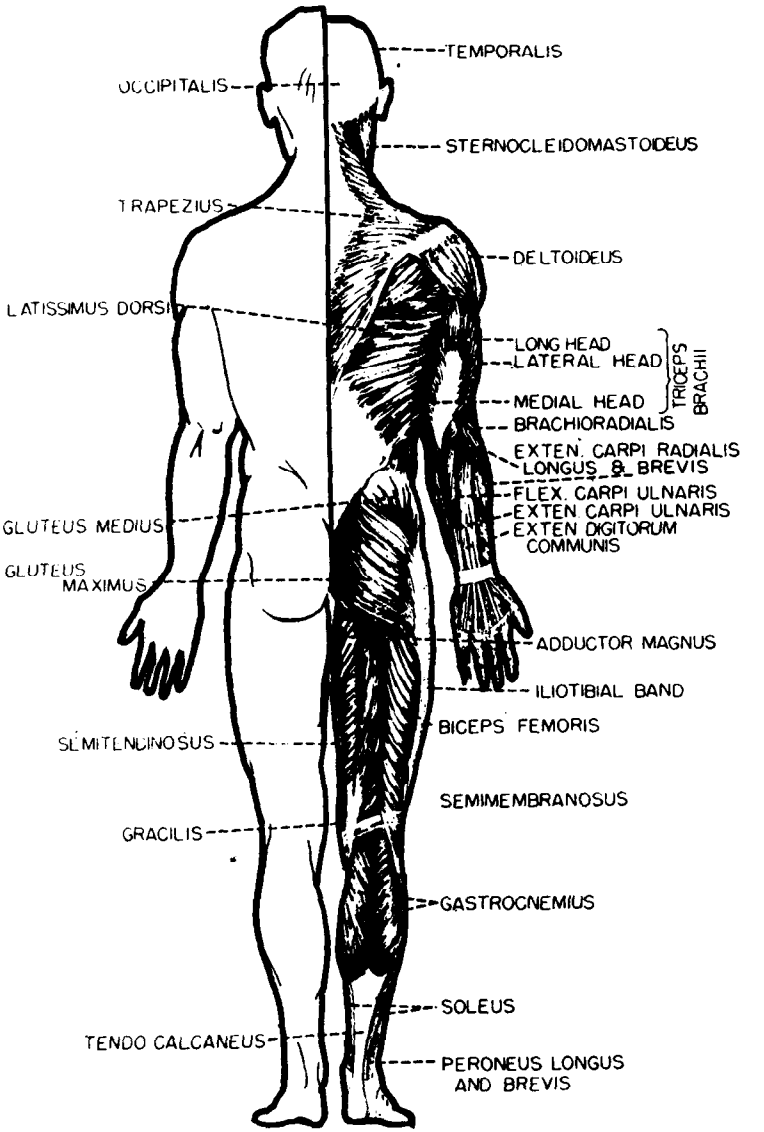


Figure 2. Important superficial muscles, posterior view.

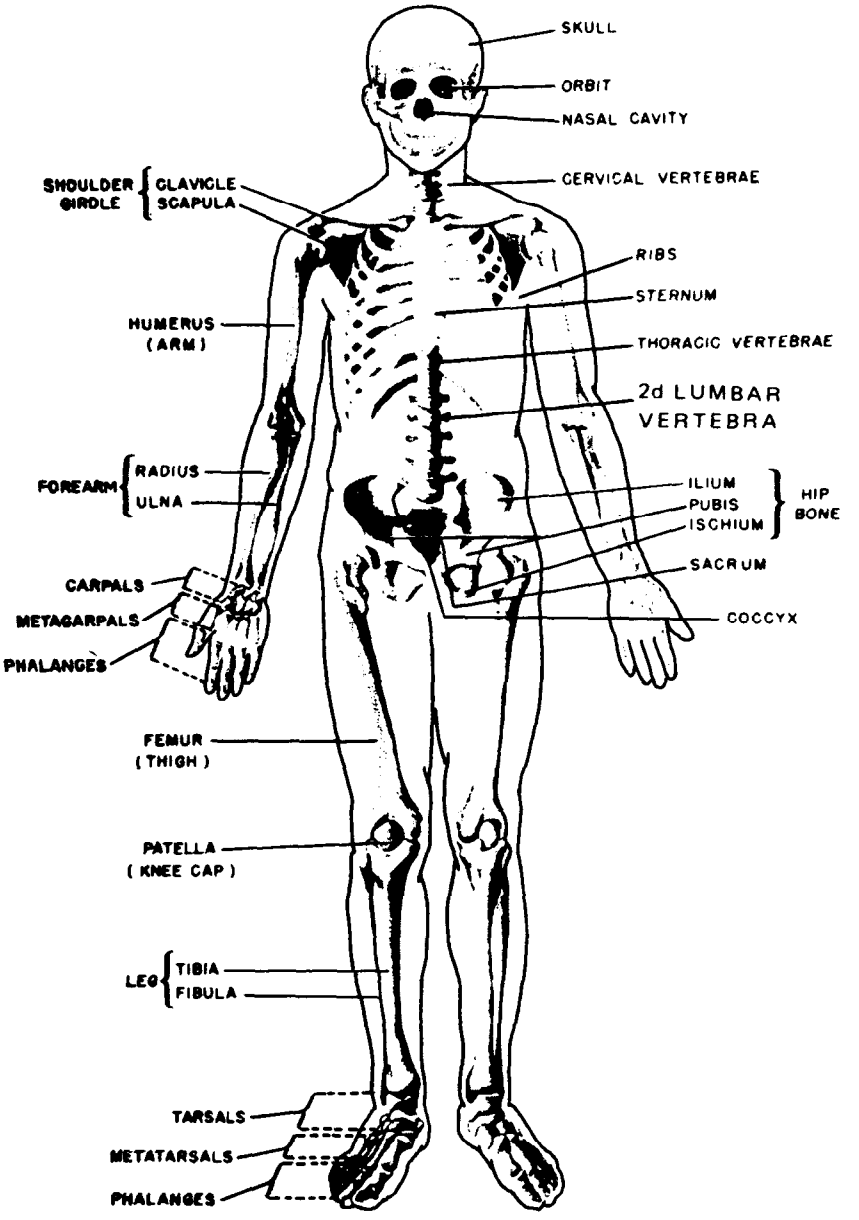


Figure 3. Human skeleton.

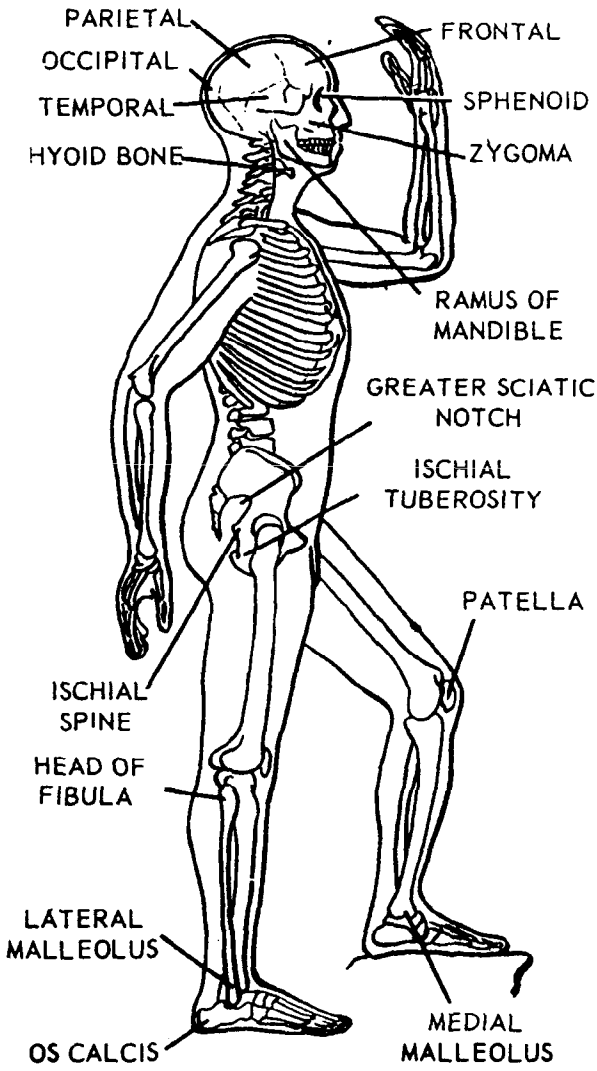


Figure 4. Lateral view.

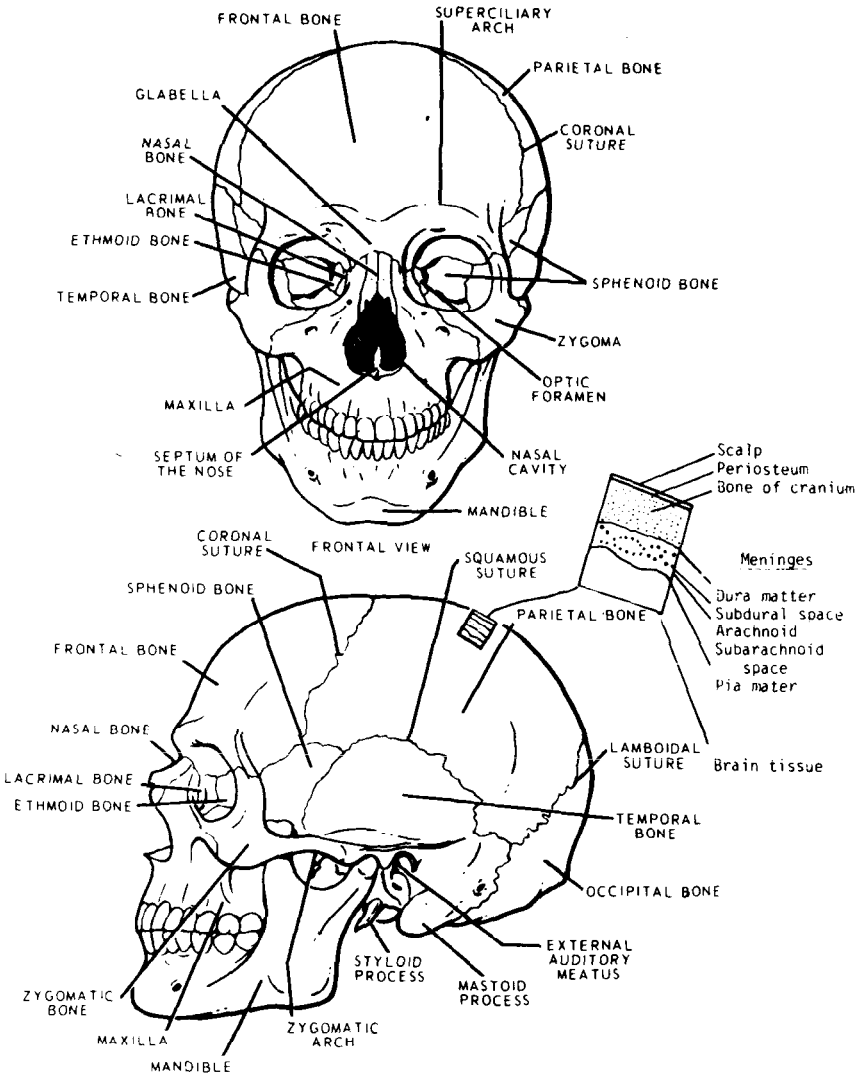


Figure 5. The skull.

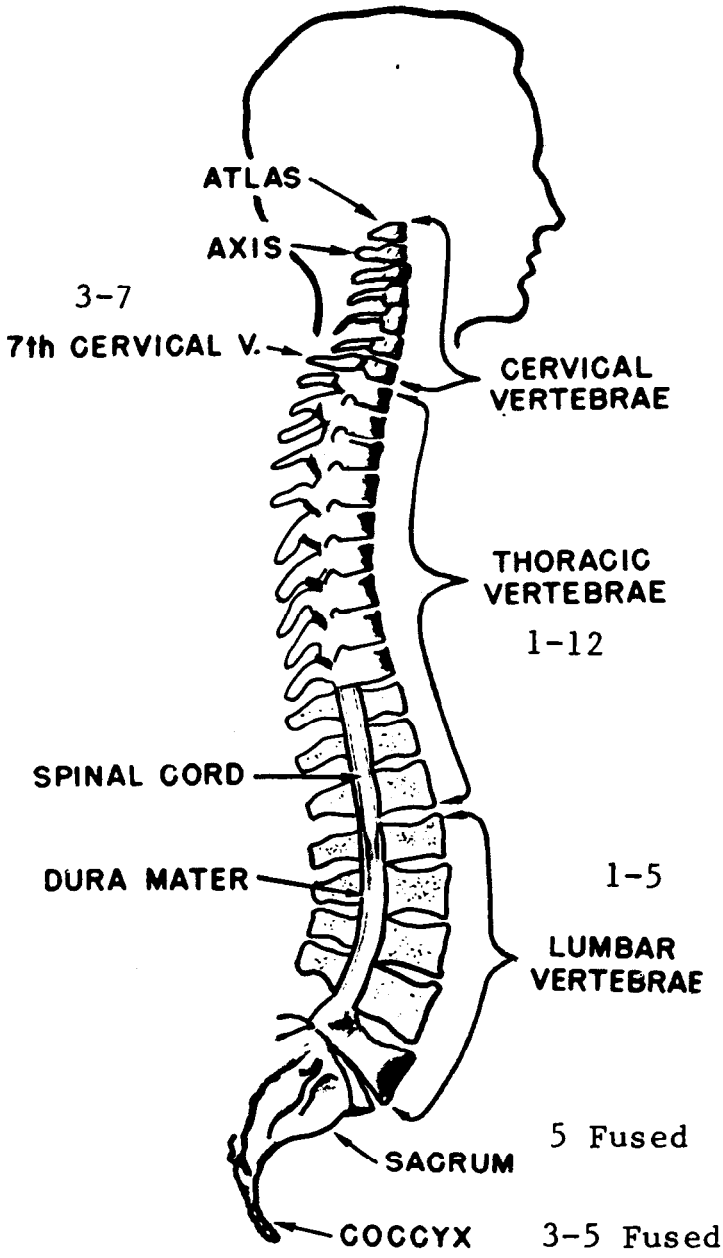


Figure 6. Vertebral column.

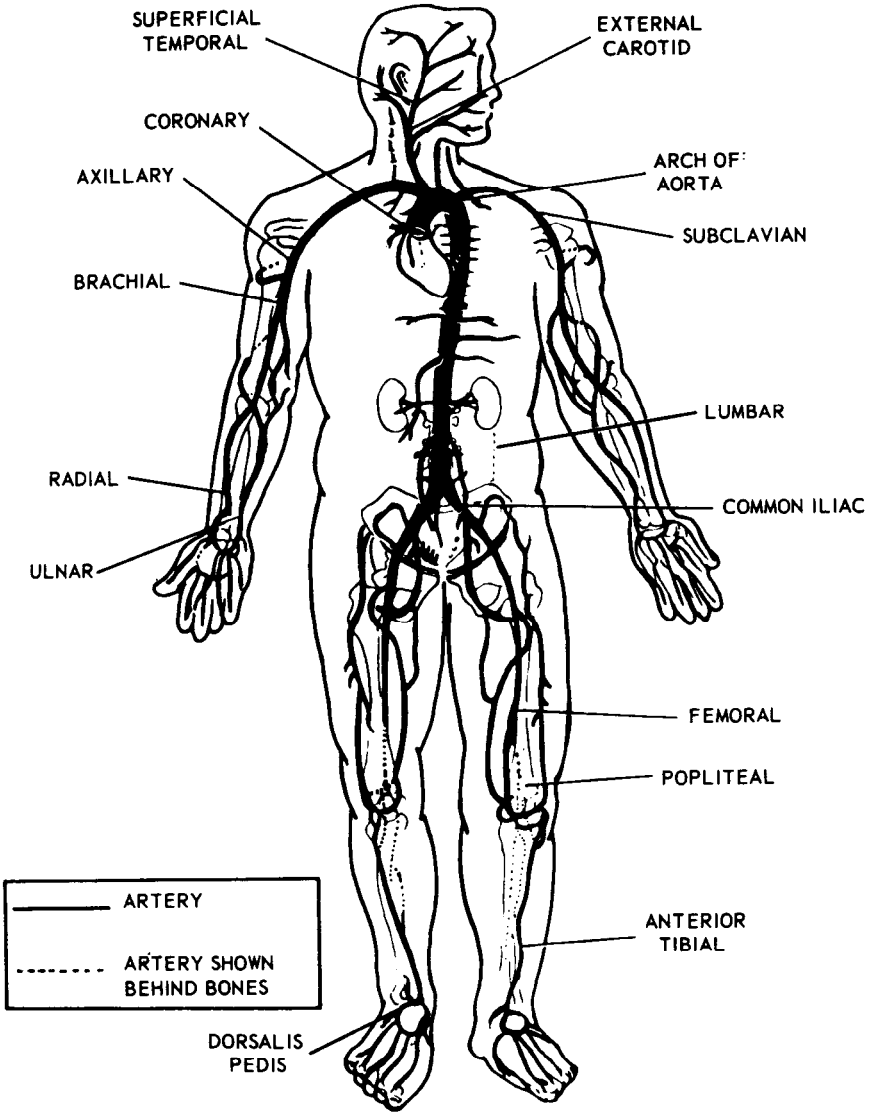


Figure 7. Large arteries of the systemic circulation.

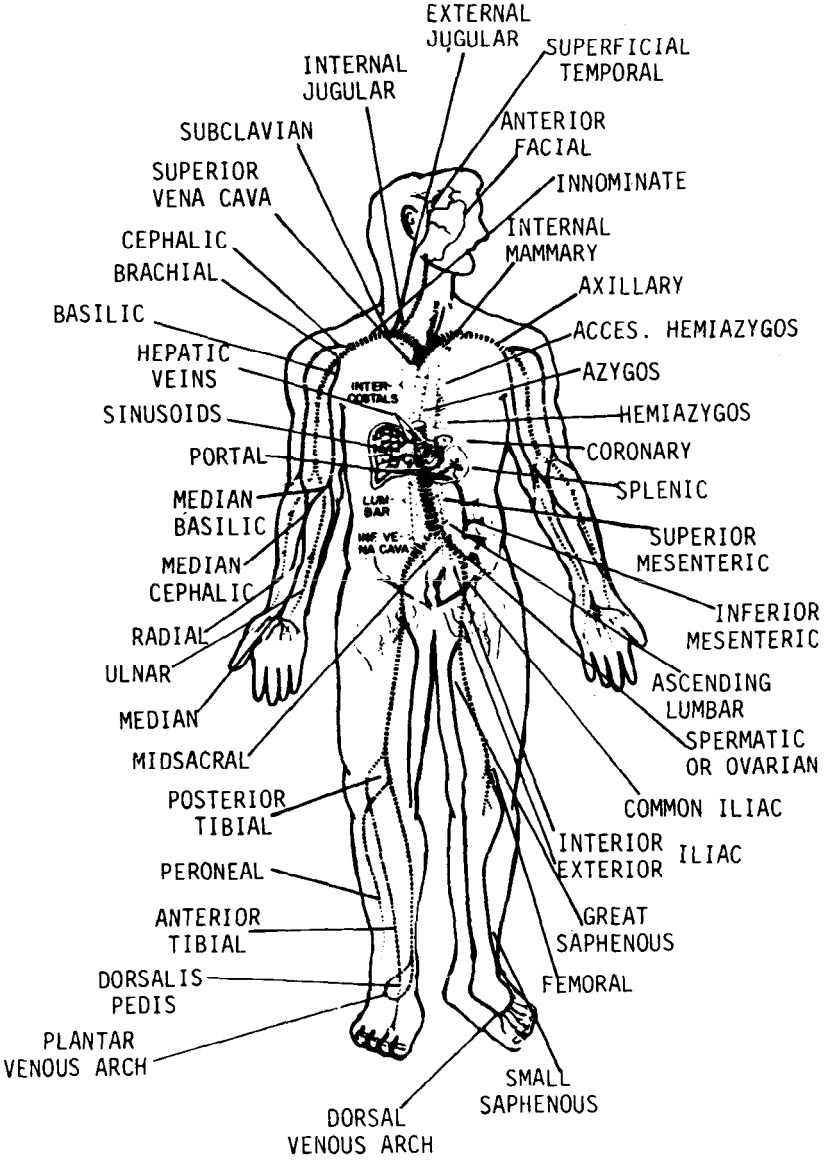
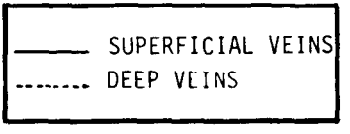


Figure 8. Large veins of the systemic circulation.



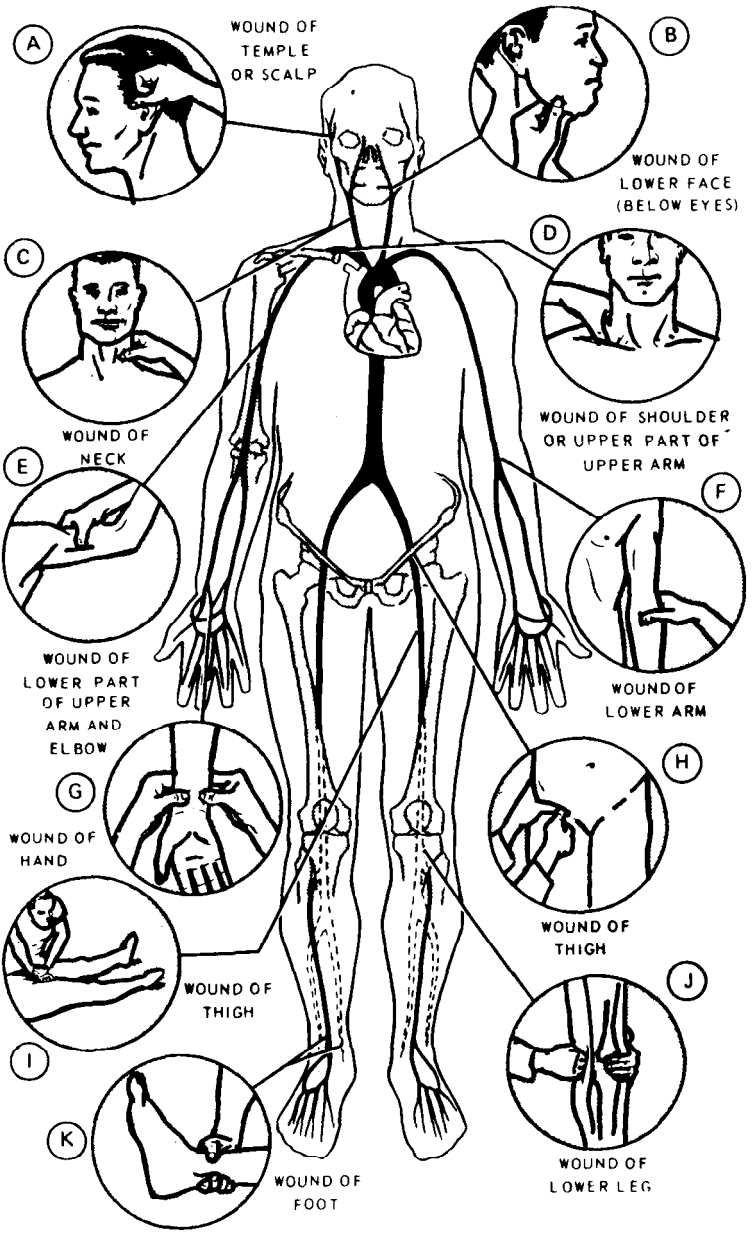


Figure 9. Pressure points for hemorrhage control.

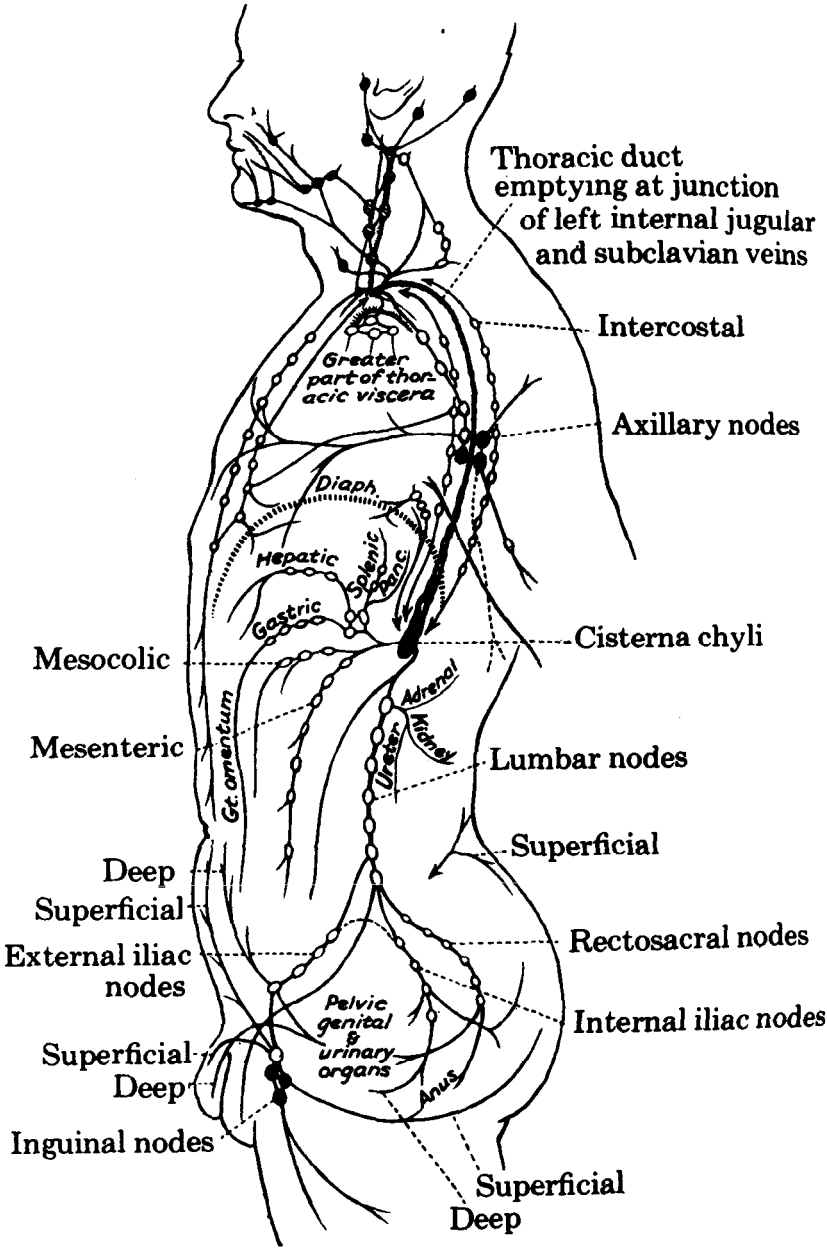


Figure 10. Lymphatic drainage of the body.

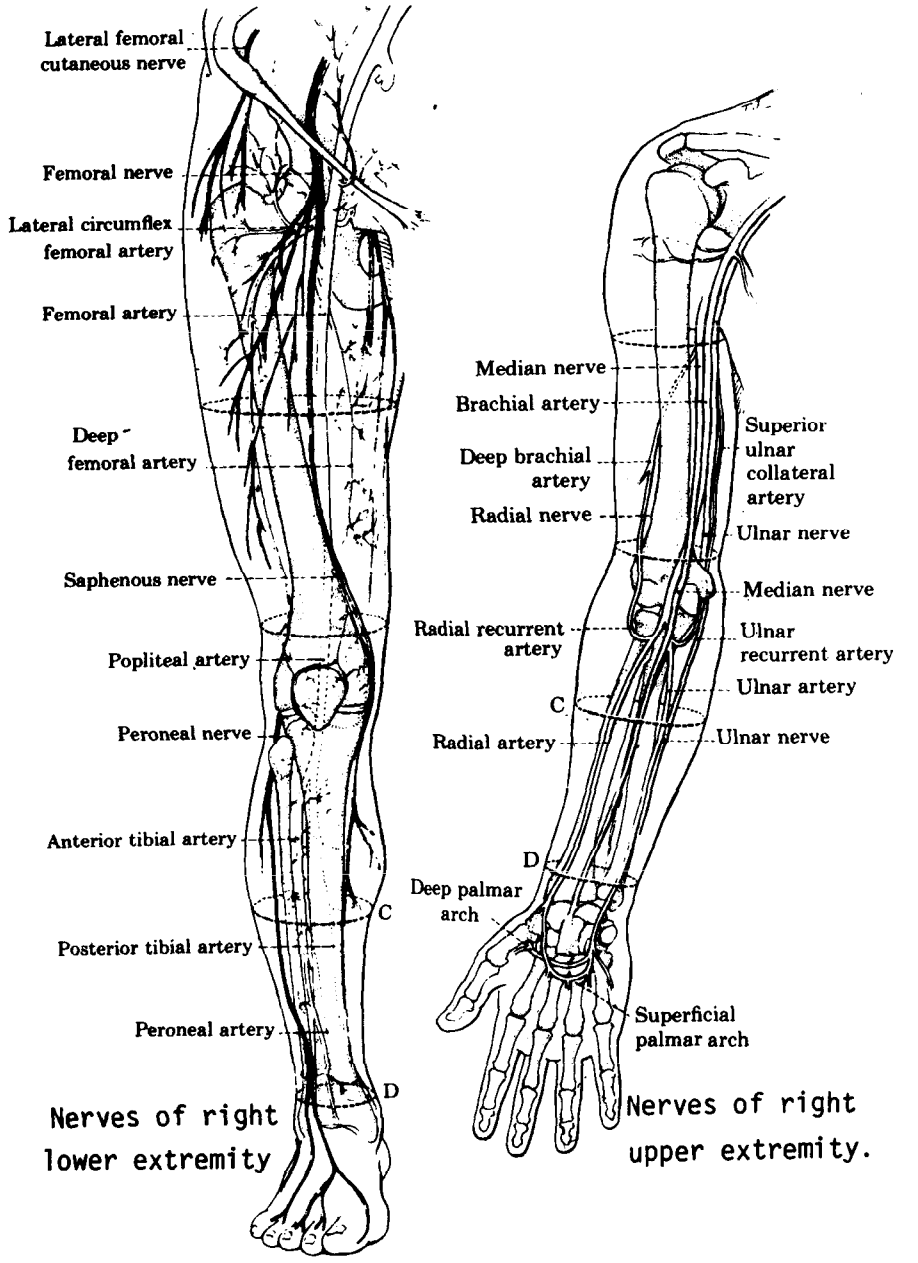


Figure 11. Nerves of the extremities.

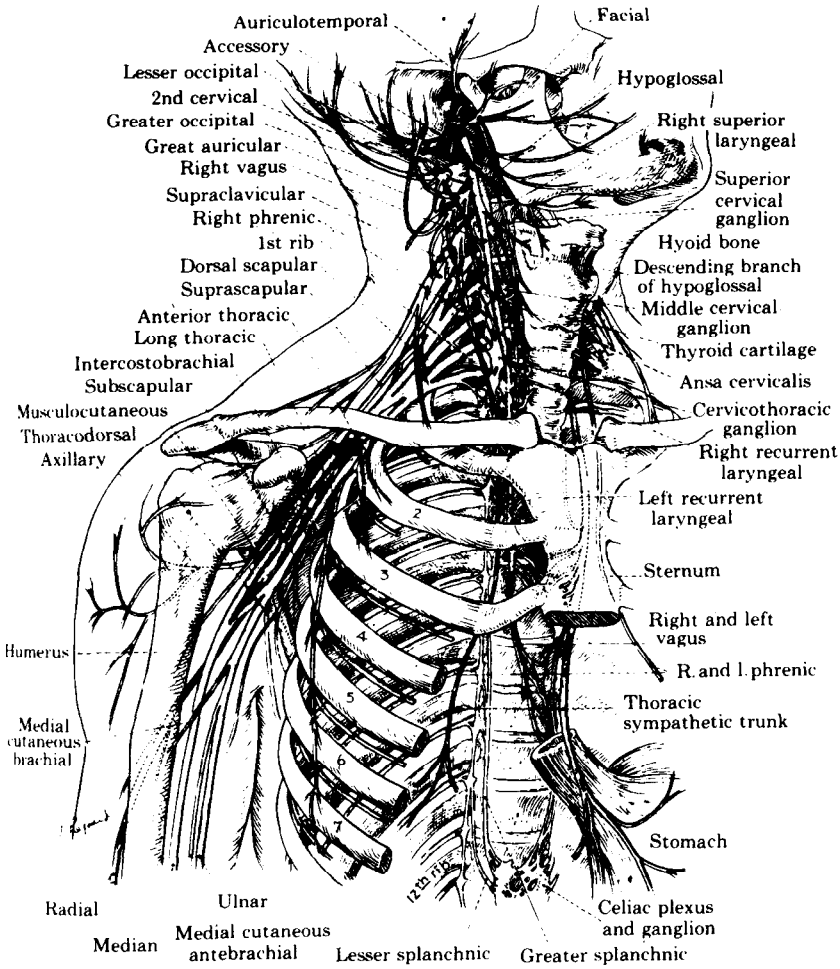


Figure 12. Deep nerves of neck, axilla, and upper thorax.

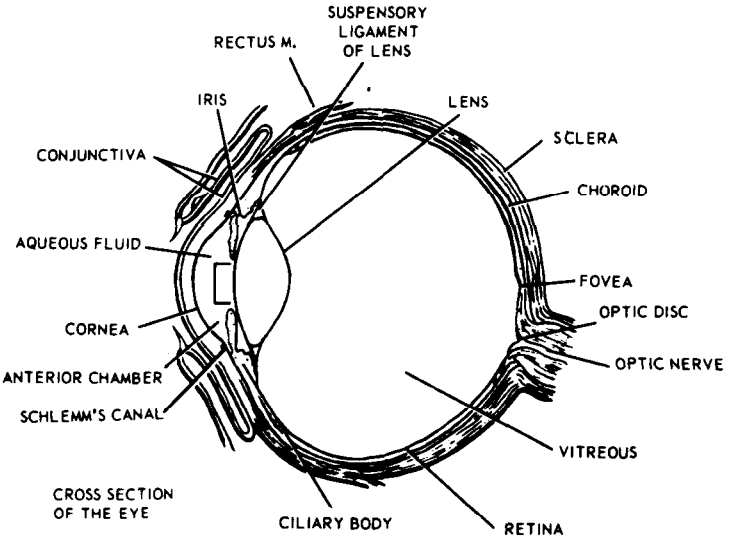


Figure 13. The eye.

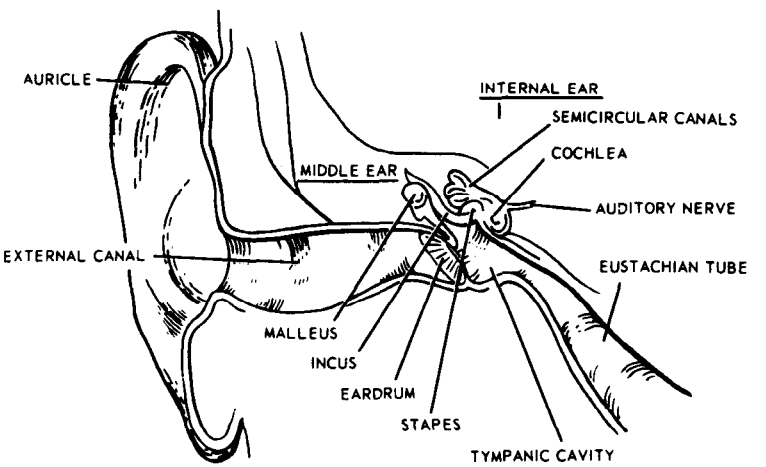


Figure 14. The ear.

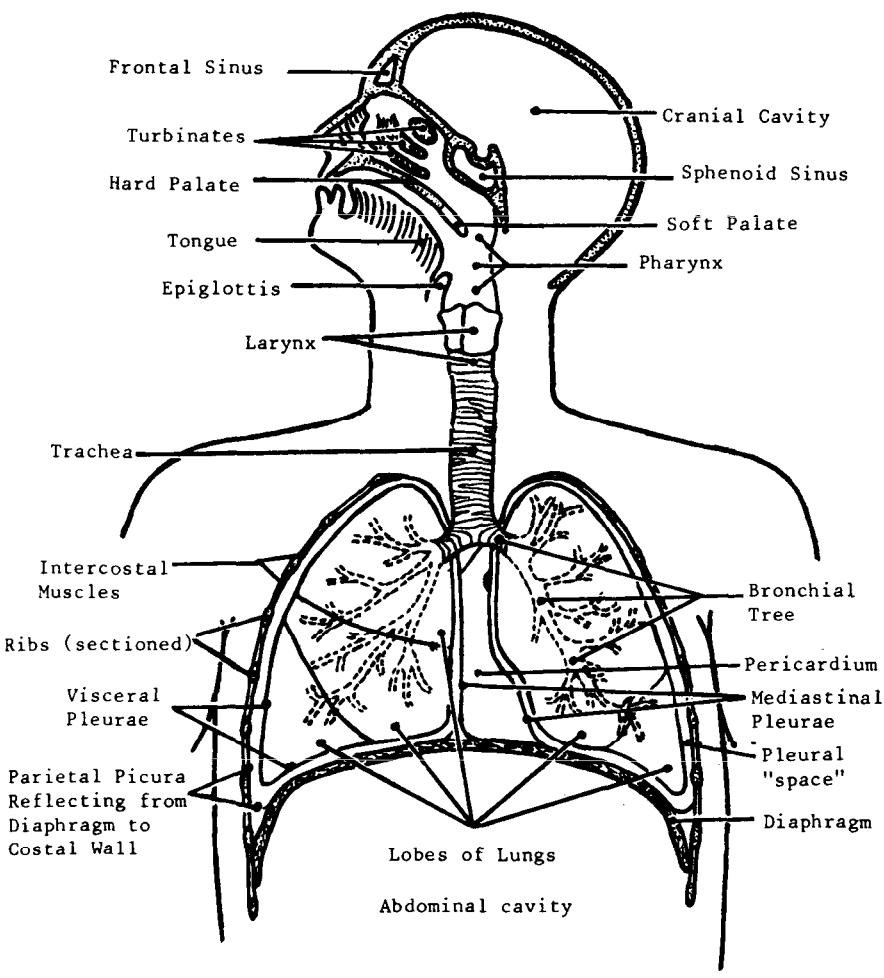


Figure 15. Schematic of the tract.

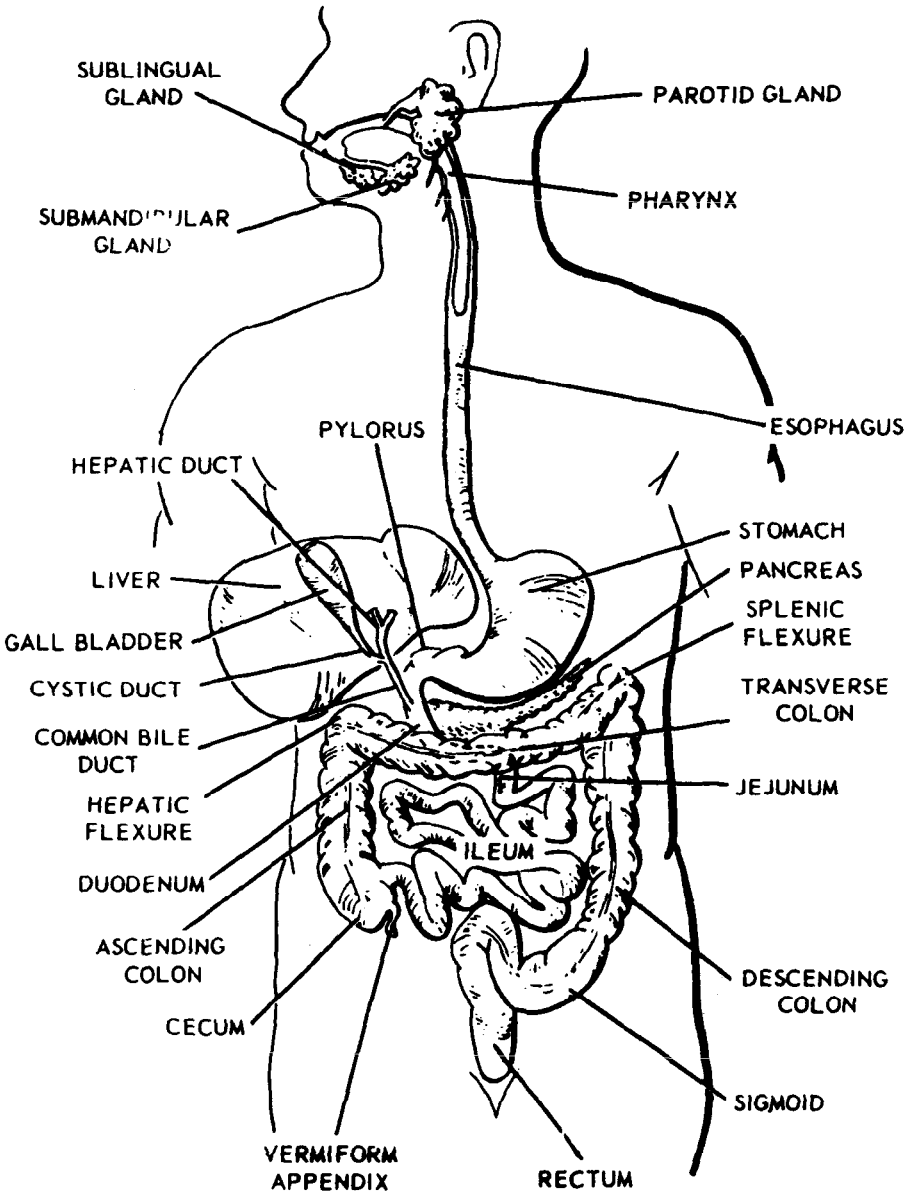


Figure 16. Digestive system.

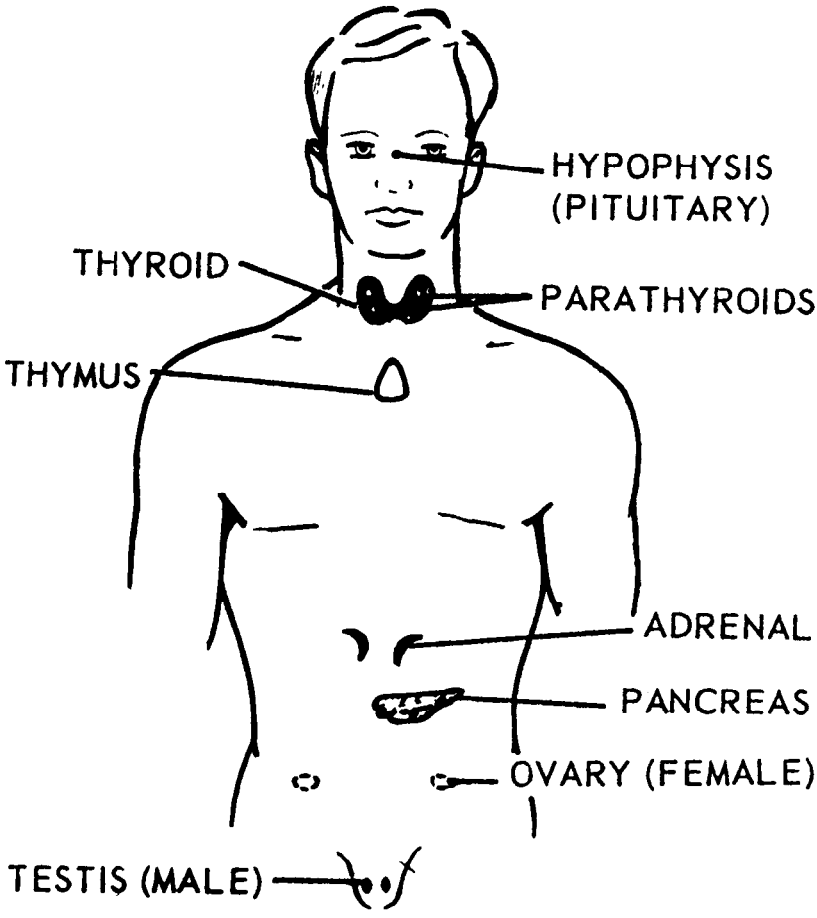


Figure 17. Endocrine system.

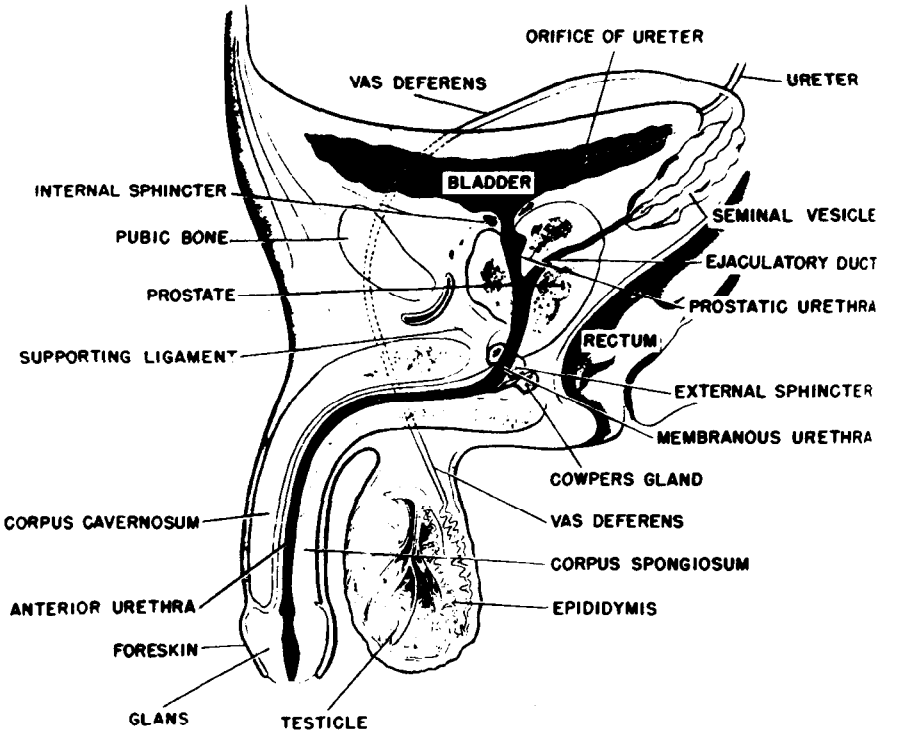


Figure 18. Male genital organs.

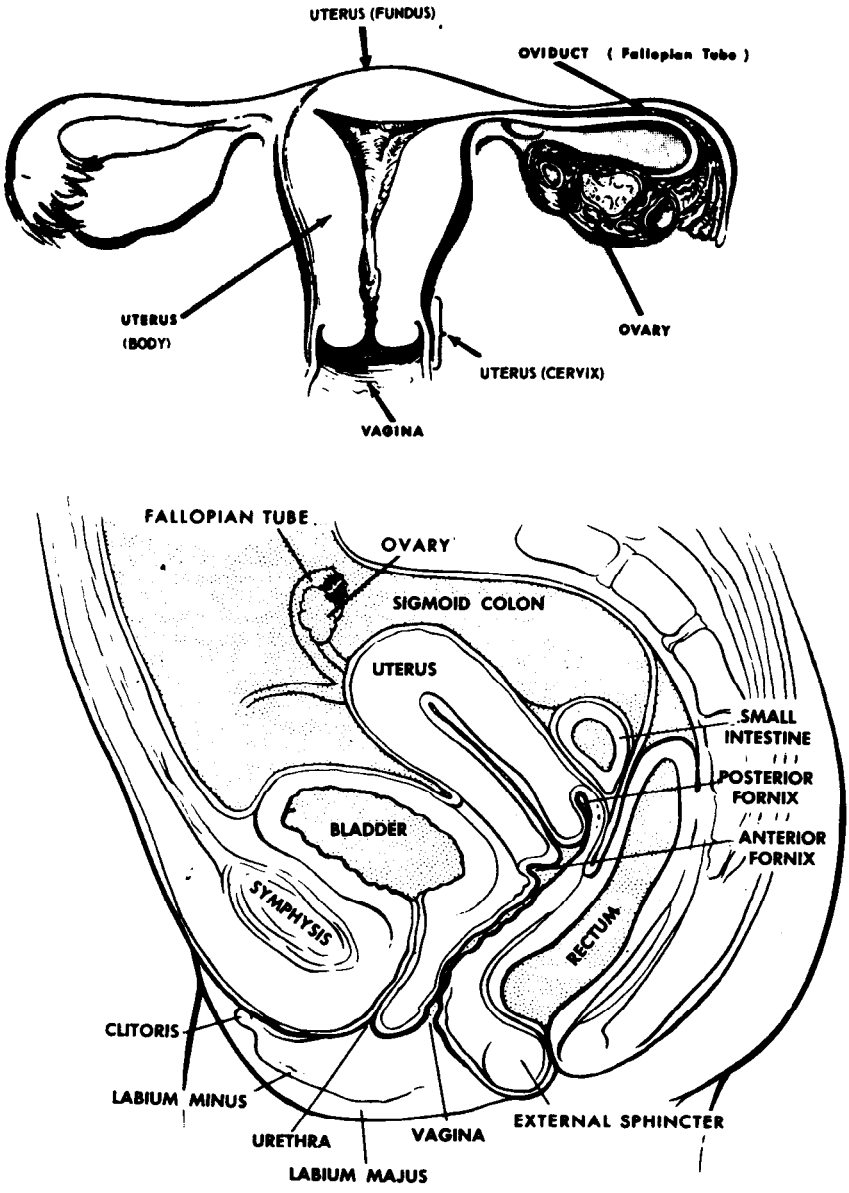


Figure 19. Female genital organs.