Most toxic diseases can be divided into those which result from consumption or exposure to toxic chemicals or poisonous plants. They can be prevented by limiting access to these chemicals and plants.

**Copper Toxicity.** Causes—(a) excessive copper ingestion, (b) absence of sufficient molybdenum in diet, (c) injury to liver tissue from plant alkaloids enabling the liver to store excess copper, (d) stress may trigger a hemolytic crisis (rapid anemia).

Signs are onset of anemia, extreme thirst, weakness. Skin and mucous membranes turn dark brown in color. Animals go down, and most will die in 1 to 4 days.

For prevention and treatment, remove flock from suspected feed or forage. Treat daily with 50 to 100 mg ammonium molybdenate and 0.5 to 1.0 gm sodium sulfate per animal which can be sprayed on feed.

**Lead toxicity** is caused by eating or licking lead paint, battery plates, used oil, and certain automotive lubricants.

Signs—Acute: Colic, salivation, muscle tremors, twitching, grinding teeth, convulsions, coma and death. Chronic: Loss of appetite, dullness, diarrhea or constipation persists for several days.

Treatment—Epsom salts, mineral oil, and bismuth orally, and calcium EDTA subcutaneously (55 mg/kg b.w.) twice daily (for no more than 5 days).

**Organophosphate Poisoning.** Cause—improper dos-
Care should be taken to properly dose, spray and dip animals with worm medications, insecticides and parasiticides, in order to avoid organophosphate poisoning.
ing, spraying or dipping, with worm medications, insecticides and parasiticides.

Signs are salivation, fast breathing, abdominal pain, muscle tremors, convulsions and death.

Treatment and Prevention—Protopam and atropine. Adhere strictly to manufacturer's directions on label.

**Fertilizer Ingestion**

**Nitrate Poisoning.** Cause—accidental ingestion of nitrate fertilizers, or plants rich in nitrates such as cereal crops, oat hay, lamb's-quarters, immature barley and wheat, and turnip, sugar beet and mangel tops.

Signs—sudden onset, difficult breathing, excitement, convulsions, and death.

Treatment—IV solution of methylene blue.

Prevention—have forage assayed for nitrate content.

**Cyanide Poisoning.**

Cause: Ingestion of forages containing high amounts of hydrocyanic acid such as chokecherry leaves, arrow grass, sorghum, Bermuda grass, Sudan grass. Plants contain more cyanide following retardation of growth due to drought or application of herbicides.

Signs are respiratory distress, cyanotic or blue mucous membranes, muscle tremors, convulsions and death.

Treatment—sodium nitrite and sodium thiosulfate may be given intravenously.

**Miscellaneous Causes.**

There are many more causes of toxicity for sheep and goats, which in some geographical areas may be more important than those mentioned. A few examples are moldy sweet clover, halogeten, lupine, western false hellebore, water hemlock, castor bean, oleander, and rubber weed.

**Lameness**

Lameness among sheep and goats is one of the most common problems faced by producers, and can lead to other complications if not treated and controlled.

**Problems of Hooves.**

These involve horny areas of the foot and its associated structures.

Causes—bruising from rough ground or stones, punctures from sharp objects, laminitis (inflammation beneath the hoof wall) usually caused by stress or dietary changes, wet conditions, separations of the white line (white line disease), poor hoof trimming practices, foot rot-causing bacteria (*Fusobacterium necrophorum* and *Bacteroides nodosus*), and various viruses.
When hooves are not properly trimmed, the feet become distorted and misshapen and the foot develops pockets and crevices. If foot rot bacteria gets into the hoof, these pockets can harbor the infection for long periods. The excessively overgrown hoof shown here caused lameness in the sheep, but there was no sign of foot rot.

Poisoning, Lameness

For prevention, avoid exposure of animals to sharp objects and wet conditions, and regularly trim hooves. If infectious causes have been diagnosed in your area, avoid additions of new animals when possible.

Problems Above Hooves.
These problems can result when the bones, joints, tendons, ligaments, vessels, muscles and nervous system are affected.

Causes: Traumatic injuries (accidents) which break bones and sprain or dislocate joints; infections with bacteria and viruses (Staphylococcus spp., Streptococcus spp., Co-
The best way to prevent hoof problems is to avoid exposure of animals to sharp objects and wet conditions and regularly check and trim hooves as necessary.

rynebacterium spp., Mycoplasma spp., Chlamydia psittaci). Caprine arthritis-encephalitis virus, which may infect the joints themselves or the spinal cord and brain. Deficiencies of essential vitamins (vitamin D, and E) and minerals (selenium, calcium, phosphorus, and copper) which result in malformations and degeneration of nervous tissue, muscles, tendons, joints and bones.

Very often with traumatic injuries the animal will be unable to bear weight on the limb, particularly of course if it is broken. Infections of the joints by bacteria are more common in lambs and kids than in adult sheep and goats, and often are associated with navel infections (navel ill). These young animals develop enlarged joints, usually have a fever, and become quite lame.

Kids and lambs infected with Mycoplasma spp. develop very high fevers, and sometimes most in the flock will become sick. Chlamydia psittaci (stiff lamb disease) is reported most often in feedlot lambs as an epidemic.

Caprine arthritis-encephalitis virus causes chronic arthritis in adult goats and rarely in young goats. One or
several joints may be swollen and sore, and weight loss often is an aftereffect. When this virus affects young kids, they may become unable to stand.

Very similar signs are seen with copper-deficient (swayback) lambs and kids. Kids and lambs affected with selenium-vitamin E deficiency or white muscle disease often stand with the shoulder blades pointed outward or are reluctant to rise.

Rachitic Rosary
Calcium and phosphorus imbalances and vitamin D deficiencies usually are manifested in kids and lambs as bumps on the rib cage (rachitic rosary) and crooked legs, especially bowed front legs.

Diagnosis and control of these diseases can be very complex, so professional advice should be sought to minimize losses.

The bacteria that cause joint ill are carried by other animals and also persist for some time in the environment. Lambs and kids usually become infected through the navel and other body openings at or near birth.

Caprine arthritis-encephalitis virus most often is transmitted through milk and colostrum to the kid.

Neither *Chlamydia* nor *Mycoplasma* persist in the environment as long as some bacteria, and so are spread mainly by direct contact.

Initially, specific diagnosis and treatment are handled best by a veterinarian. Generally speaking, the bacterial, chlamydial, and mycoplasmal causes of arthritis can be treated with antibiotics but success depends on whether the right treatment is given early enough. There is no specific treatment for caprine arthritis-encephalitis.

Vitamin and mineral deficiencies often can be treated by correcting the deficiency, but this is not always successful in advanced cases.

Situations in which very traumatic events might occur should be avoided. Navel ill can be reduced by keeping lambing and kidding areas clean, using iodine on navels, and making sure that adequate colostrum is consumed by newborns.

Caprine arthritis-encephalitis can be controlled by separating kids from infected does, and providing a safe source of colostrum and milk. When outbreaks of chlamydial and mycoplasmal arthritis occur, separate affected animals from the normal ones. Consult your veterinarian for details.