

# 100 million volts are frightful

By DIETER KRIEGL

**EDITOR'S NOTE:** This is the seventh article in a continuing series of stories on the weather — one of the most awesome and vital forces on Earth.

Ever since man first looked into the sky and saw a lightning bolt crash through the forest, he has been awed by its power and ability to destroy.

Today we look at lightning and thunder through scientific eyes, but generations before us associated the rumble and flash of fire with "the gods." In either case, lightning has always been something which we respect and for good reason.

It is estimated that lightning kills about 150 persons per year, injures an additional 250, and causes property losses in excess of \$100 million. Few farmers have not felt the destruction that lightning can produce in just a flash. Barns have been ignited, cattle have been killed, and majestic trees have been left scattered across pretty landscaped lawns.

Destructive and frightening as lightning is, there is an expression some people use which would dare "the gods" to strike them with that tongue of fire. "May lightning strike me down," they say, fully realizing that the chances of it happening are pretty slim. And that they are.

But the National Oceanic and Atmospheric Administration, (NOAA), has calculated that some 1800 thunderstorms are in progress over the Earth's surface at any given moment, and that lightning strikes the Earth 100 times each second. Thus, lightning has become the killer and destroyer of more lives and property than tornadoes and hurricanes.

NOAA, a branch of the U.S. Commerce Department, is studying lightning intensively. By using sophisticated equipment on land and sea, and in the air, scientists are attempting to learn what causes thunderstorms and what might be done to lessen their killer attitudes.

So far no completely acceptable theory on the cause of lightning has been forwarded. A brochure on the subject, published by the Department of Commerce says:

Lightning is a secondary effect of electrification within a thunderstorm cloud system. Updrafts of warm, moist air rising into cold air can cause small cumulus clouds to grow into the large cumulonimbus cloud systems we associate with thunderstorms. These turbulent cloud systems tower above their companions, and dominate the atmospheric circulation and electrical field over a wide area. The transition from a small cloud to a turbulent, electrified giant can occur in as little as 30 minutes.

As a thunderstorm cumulonimbus develops, interactions of charged particles, external and internal electrical fields, and complex energy exchanges produce a large electrical field within the cloud. It is believed that electrical charge is important to formation of raindrops and ice crystals, and that thunderstorm electrification closely follows precipitation.

The distribution of electricity in a thunderstorm cloud is usually a concentration of positive charge in the frozen upper layers, and a large negative charge around a positive area in the lower portions of the cloud.

The earth is normally negatively charged with respect to the atmosphere. As the thunderstorm passes over the ground, the negative charge in the base of the cloud induces a positive charge on the ground below and several miles around the storm. The ground charge follows the storm like an electrical shadow, growing stronger as the negative cloud charge increases. The attraction between positive and negative charges makes the positive ground current flow up buildings, trees, and other elevated objects in an effort to establish a flow of current. But air, which is a poor conductor of electricity, insulates the cloud and ground charges, preventing a flow of current until large electrical charges are built up.

A point is eventually reached when the electrical charges can no longer be contained. Then lightning strikes with electrical power which can be as high as 100 million volts. Just how that happens, and why we hear thunder will be the subject of next week's "Weather Report."



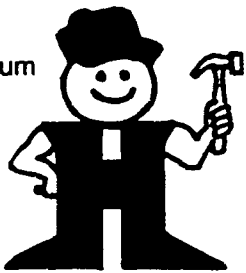
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## Cattle increased

WASHINGTON, D.C. - 1,586,000, 31 per cent more than 1975 and 22 per cent more than two years ago. Sept. 1 for slaughter market in the seven states preparing monthly estimates totaled 6,432,000 head, up eight per cent from last year's record low number for Sept. 1 but still six per cent less than the same date in 1974, according to the Crop Reporting Board. The number on feed Sept. 1 was above last year in five of the seven states.

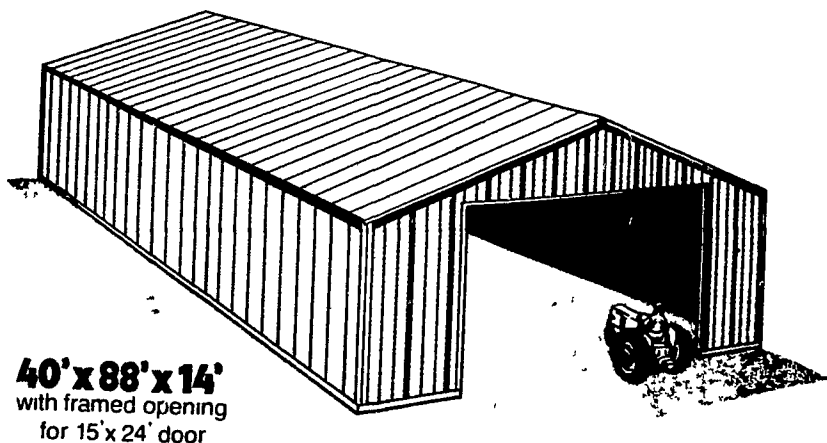
August placements of cattle and calves on feed in the seven states totaled 1,404,000, 10 per cent more than last year and 16 per cent above the same month in 1974. Placements were above last year in six of the seven states.

Fed cattle marketed during August totaled

than 1975 and 22 per cent more than two years ago. Marketings were above August 1975 in all States except Arizona which was unchanged. Other disappearance during August totaled 52,000, compared with 43,000 in the same month a year ago.

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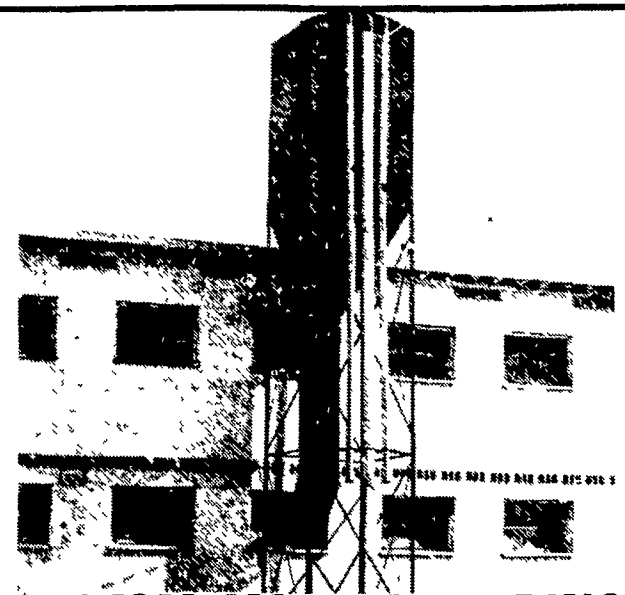
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