

Positive lightning found in Florida

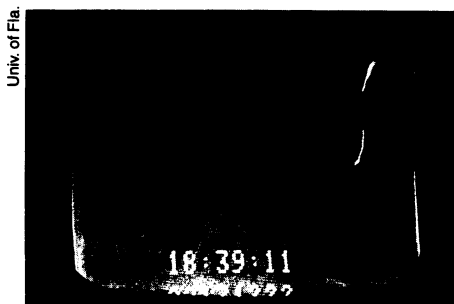
Evidence of the existence of positively charged lightning is growing as fast as a thundercloud on the horizon. "We definitely proved there is positive lightning in Florida summer thunderstorms," says Martin Uman, director of the Lightning Research Laboratory at the University of Florida in Gainesville. The Florida group, whose report is due to appear in an upcoming *JOURNAL OF GEOPHYSICAL RESEARCH*, is one of a number of research teams from around the country that has found evidence of the phenomenon. "Nobody really doubted that there was positive lightning," Uman told *SCIENCE NEWS*. It's just that until recently the data accumulated by researchers "were not really strong."

Most grade-school science texts still describe lightning as the discharge of a negative electric charge from a cloud to the ground or to some other receiving antenna. But during the 1950s, Swiss researchers recorded data showing positively charged lightning at monitored European towers. That opened debate as to whether the positive-current flow was natural, or just some anomaly caused by the towers, Uman says. Then, during the early 1970s, Japanese scientists began reporting what appeared to be positively charged lightning occurring during winter snowstorms. Highly suggestive as their data were, Uman says, the findings still seemed something less than proof positive. There was also some question ini-

Love Canal accord

An out-of-court settlement was reached this week between 1,345 residents of the Love Canal neighborhood in Niagara Falls, N.Y., and attorneys for Occidental Petroleum Corp. Occidental is the parent company of Hooker Industrial and Specialty Chemicals, a company it purchased in 1968. In 1978, residents of the Love Canal area sued Hooker for health and property damages which they claim occurred as a result of exposure to toxic wastes that had been improperly buried at the Love Canal toxic-waste dump by Hooker between 1942 and 1953.

The proposed settlement, which must still be submitted for court approval, would cost Occidental between \$5 million and \$6 million, the company says. Insurance would pay the remainder of the agreed-upon settlement, expected to total up to \$25 million. This action would resolve 94 percent of the claims against Occidental over Love Canal contamination. However, the company notes, "The settlement isn't an admission of any negligence on the part of Occidental and shouldn't be interpreted as such." □



Video-tape image of one of three positive-lightning pulses recorded by the Florida team. Though positive lightning is visually undistinguishable from negative lightning, an antenna measuring its associated electric field recorded the reversed (or positive) polarity.

tially as to whether the phenomenon might occur only in winter storms.

That debate, at least, now seems resolved. Not only has the Florida team reported positive lightning during summer storms, but so also have a host of other U.S. storm research centers, including the National Oceanic and Atmospheric Administration's Severe Storms Laboratory in Norman, Okla.

More than fascination lures researchers to study positive lightning. Explains David Rust at the Norman laboratory, "The maximum current that flows in positive flashes to ground tends to be rather extreme." Data obtained from Swiss monitoring stations "suggest the current can be on the order of 100,000 to 250,000 amperes. That's about an order of magnitude [factor of 10] higher than the average for negative lightning," he says. Moreover, he adds, "positive lightning tends to have what we've

documented out here as a continuing current. What that means is that after the lightning attachment is made with the ground, it stays attached for something on the order of a quarter of a second." Current surges typically associated with negative lightning, by contrast, are "over in less than a millisecond [thousandth of a second]," he says. The result is that these positive bolts "are more devastating," Rust observes.

If it turns out positive lightning occurs naturally in the type of storms that are found east of the Rocky Mountains, Rust says, "then there is perhaps a category of lightning that has not been studied very much but that may be quite dangerous to structures on the ground." He says that owing to how positive lightning appears to move through a cloud and where it generally occurs, "We're also concerned about its being a hazard to aviation." — *J. Raloff*

Cold lasers employed to treat paralysis

First used to treat pain, "cold" lasers are now being used in an attempt to restore motor function and to control spasticity in paraplegics. Following a pilot study on 20 patients with varying kinds of brain and spinal-cord injury during the past year, Judith Walker of the Walker Institute in West Los Angeles, Calif., is now beginning a controlled, double-blind clinical trial using the new lasers to promote normal function in damaged nerve pathways.

In contrast to the cutting and welding lasers used in surgery, cold lasers are extremely low-power devices. They are unable to burn skin. In fact, their use is undetectable by patients whose eyes are closed; the Food and Drug Administration (FDA) considers them to be of such low power as to constitute no physical harm.

According to FDA, Walker was the first U.S. researcher to use cold lasers in a controlled clinical trial (SN: 2/12/83, p. 100). That was for pain relief. Though her research in that area continues — she's just begun a clinical trial of laser irradiation for relief of pain from trigeminal neuralgia (severe facial pain), rheumatoid arthritis and acute-onset shingles — her newest endeavor involves laser nerve stimulation of paralysis victims. The project is being funded by the American Paralysis Association, whose president, Kent Waldrep, underwent treatment at Walker's clinic for his own spinal-cord injury. Originally par-

alyzed from the neck down, he now boasts of doing sit-ups, push-ups, crawling, kneeling and standing.

In her paralysis therapy, Walker again used a helium-neon laser (with a one milli-watt output and 632-micrometer wavelength). Patients are irradiated for 30-second intervals at two points on the skin overlying the saphenous nerve in the foot, and at points overlying the radial and medial nerves (each within two inches of the wrist). Individuals may be treated up to five times per day.

Walker says, "We were able to demonstrate that the laser suppresses clonus [an involuntary exaggeration of the knee-jerk reaction], and it seems to help spasticity." A series of somatosensory evoked-potential measurements — to measure how well the spinal cord is acting as a communications conduit — also showed improvement after therapy, she says.

Michael D. Walker, director of the Stroke and Trauma Program at the National Institutes of Health, found her evoked-potentials comment "very interesting." However, as he is unfamiliar with Judith Walker's research, he said, "I'd be reluctant to say [her claims are] fantastic or off-the-wall; I just don't understand them. But," he added, "just because I don't understand the physiological process of what's going on doesn't mean nothing is happening."

— *J. Raloff*