Chapter 5 Ducking first a flash and then a roar (electricity and magnetism)

Here are the references and web links for the stories in the book. Recently added references are highlighted. For updates to those stories and for all the new stories, go to http://www.flyingcircusofphysics.com/News/NewsDetail.aspx?NewsID=41

August 2011

5.1 Lightning

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=VTztOz_EUrE&mode=related&search</u>= Video of very close lightning strike

<u>http://www.youtube.com/watch?v=EM66Nu-qCo4&mode=related&search</u>= Video of lightning strike

http://www.air-and-space.com/lightning.htm photos and some sequenced shots (stepped movies)

<u>http://www.youtube.com/watch?v=GR_EoW0fpws&mode=related&search</u>= Video of many lightning strikes

http://wvlightning.com/types.shtml Many photos

<u>http://www.prazen.com/cori/links.html</u> Many photos from Australia. Click on the lightning choices.

http://www.worth1000.com/entries/153500/153529qVxu_w.jpg Photo of tornado and lightning from the cloud to one side of the tornado.

http://205.243.100.155/frames/longarc.htm#Large_LF Photos and discussion, big sparks, lightning

<u>http://www.cabinetmagazine.org/issues/3/allaboutlighning.php</u> Interview with Martin Uman, an expert on lightning that I have followed for years

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Journal reference style: author, journal, volume, pages (date)

Book reference style: author, title, publisher, date, pages

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5.2 Lightning: people, cows, and sheep

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

Videos

http://www.youtube.com/watch?v=CpxKEGdfDxI Football (soccer) players hurt by ground currents

Photos

http://www.ucar.edu/communications/quarterly/winter0506/storms.jsp Henson, B., "Storms and stadiums," UCAR Quarterly (Winter 2005-2006)

http://www.smh.com.au/ftimages/2002/07/22/1026898970644.html lightning during a baseball game

http://wx-man.com/blog/?cat=73 scroll down to the lightning story

http://www.abc.net.au/rural/content/2005/s1497922.htm cattle

http://www.utahweather.org/UWC/weather_pictures/weather_photos_1900-2002.html Large number of sheep killed by lightning but, in spite of what the captions say, not by a direct hit.

http://www.lightningsafety.com/nlsi info/damage photos.html Photos and description of damage to lightning rod, animals

http://205.243.100.155/frames/human_LF2.jpg Photo of Lichtenberg figure in the lightning damage to a man's back, as described in Flying Circus

http://www.postgradmed.com/issues/2003/06_03/puzzles_answer.htm Discussion and photo, lightning from a clear sky and damage done to a victim

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5.3 Lightning: vehicles

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=eX6Xk0DRVvE&feature=related</u> Lightning strikes airplane just after takeoff

http://www.youtube.com/watch?v=036hpBvjoQw&NR=1 Lightning strikes Qantas airplane http://www.youtube.com/watch?v=3ydadIprhMI&NR=1 Lightning strikes car

http://www.youtube.com/watch?v=nI79A2yXo9U&NR=1 Lightning hits car (caution: mild cursing)

http://www.youtube.com/watch?v=K-O26xuAD1o&feature=related Lightning strikes tree and flashes to parked car

<u>http://www.youtube.com/watch?v=lv006jJjo6w&NR=1</u> Way cool video, TV host sitting in a car while it receives huge sparks at many hundreds of kilovolts.

http://www.youtube.com/watch?v=iIYQcHfSEvI Video, include video from within airplane, showing the strike to the fuselage

http://www.youtube.com/watch?v=4sA-Hk_jnPg Video of intense St. Elmo's fire on windshield of airplane

<u>http://www.crh.noaa.gov/pub/ltg/plane_japan.php</u> Images of airplane being hit by lightning <u>http://www.youtube.com/watch?v=6EUh-Nmp6aY</u> Video of lighting strike to a storm-penetrating aircraft

<u>http://www.youtube.com/watch?v=bZwlD-Z0zmE&NR=1</u> Man in a Faraday cage, big sparks <u>http://www.youtube.com/watch?v=lUUOdO6eEZA&mode=related&search</u>= Video of car as it is hit by lightning

<u>http://www.deas.albany.edu/deas/bvonn/707wingt.html</u> Photo and description of damage to wingtip of a Boeing 707.

<u>http://www.exo.net/~pauld/popularerrors/popularerrors.html</u> This is an old photograph of a large spark to a (metal) car in which a man sits. The current stays on the outside of the metal and jumps across the insulating rubber tire. The man, being in the interior of the metal enclosure, is unaffected.

http://www.wrh.noaa.gov/images/pqr/05082003_sle.jpg Photo of damage to radio antenna on a car

<u>http://www.prazen.com/cori/images/van1t.jpg</u> Photo of damage *inside* a car (yes, sometimes the lightning can damage inside a car)

http://www.youtube.com/watch?v=w4VgkmYOUPk Video of lightning hitting car

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5.4 Lightning: trees, towers, and ground

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

Video

http://www.youtube.com/watch?v=gKPwkau0Dh0&NR=1 Lightning hits a tree

<u>http://www.youtube.com/watch?v=f6PJdAee7qY&NR=1</u> Damage due to a tree that exploded when hit by lightning

<u>http://www.youtube.com/watch?v=w4aZYvPrOGQ&NR=1</u> Lightning hits a tree <u>http://www.metacafe.com/watch/715760/ligtning_strike_tree_in_slow_motion/</u>

Photos and descriptions

http://www.strangedangers.com/images/content/102407.jpg

http://www.lightning.ece.ufl.edu/pictures/fulgurites/GUINNESS.JPG Fulgurite exposed by digging

http://www.celestialmonochord.org/2006/05/sidewalk_fulgar.html Sidewalk fulgurite photos and discussion

http://www.visionforum.com/hottopics/blogs/dwp/2005-05-25_fulgurite2.gif Fulgurite photos, including cross section

http://www.thunderbolts.info/tpod/2006/image06/060309lightning.jpg Pattern burned into a golfing green by lightning

<u>http://geology.about.com/library/bl/images/blfulgurite.htm</u> Fulgurite photo and brief discussion <u>http://plaza.ufl.edu/rakov/figures/2.jpg</u> Photo showing hollow interior of fulgurite section

http://www.holoscience.com/views/view_mars.htm Scroll down to the photos of lightning damage

http://www.lightningsafety.com/nlsi_info/damage_photos.html Photos and description of damage to lightning rod, animals

http://www.electricalfun.com/lightning_building.jpg_Photo

http://www.hiltonpond.org/ThisWeek050508.html Photos and description of damage to a tree http://www.wrh.noaa.gov/images/pqr/05082003_sle.jpg Photo of damage to radio antenna on a car

http://www.thenews.co.uk/ViewArticle.aspx?SectionID=455&ArticleID=1066984 Photo and news story about fire caused at a Holiday Inn

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5.5 Bead and ball lightning

This item is discussed in the book *The Flying Circus of Physics*, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.youtube.com/watch?v=sx1GJnOBzFw

<u>http://www.youtube.com/watch?v=aEC-ef72Wfc&NR=1</u> Video of plasma balls that may be related to naturally occurring ball lightning

<u>http://www.unexplained-mysteries.com/gallery/displayimage.php?album=30&pos=4</u> Old photo of ball lightning

http://www.daviddarling.info/encyclopedia/B/ball_lightning.html Photos plus speculation

http://www.thunderbolts.info/webnews/NewsPics/Fatal%20ball%20lightning.jpg Classic engraving of a researcher being struck by ball lightning

<u>http://www-personal.umich.edu/~reginald/ball_l.html</u> Plasma ball inside a microwave oven. Link allows download of a video.

http://library.thinkquest.org/03oct/00758/en/disaster/lightning/ball_lightning.jpg Photo http://www.pbs.org/wgbh/nova/sciencenow/3214/02-vari-03.html Classic drawing of ball lightning entering a room

http://news.nationalgeographic.com/news/bigphotos/32051113.html Classic drawing http://www.blahblahblahg.com/wordpress/wp-content/uploads/2006/07/ball lightning clip.jpg Another classic drawing

Bead lightning http://wylightning.com/types.shtml Scroll down to the bead lightning http://www.britannica.com/ebc/art-50963 Photos

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5.6 Sprites

This item is discussed in the book *The Flying Circus of Physics*, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.youtube.com/watch?v=PKL90WwmVjs Video

http://elf.gi.alaska.edu/ Images and discussion

http://www.spritesandjets.com/ Information and diagram

<u>http://sprg.ssl.berkeley.edu/atmos/sprite.html</u> Photo plus description. Click on the button to get a menu for videos (GIF files)

http://www.nasa.gov/centers/goddard/news/topstory/2005/sprites.html Photos plus news story http://www.everythingweather.com/lightning/other.shtml Photo plus description

http://www.kurasc.kyoto-u.ac.jp/~epic/figure/sprites.gif Photo

http://environment.newscientist.com/article/dn8733.html Photo plus news story

http://umbra.nascom.nasa.gov/spd/sprites.html Photos plus description

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5.7 Lightning rods

This item is discussed in the book *The Flying Circus of Physics*, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.napa.ufl.edu/2002news/lightningrodph.htm</u> Photo of strike to lightning rod and the suggestion that the rods may not protect a house where the soil is sandy. http://www.sas.org/tcs/weeklyIssues/2004-05-

07/feature2/art/MLO_lightning_%20rod_by_Mims.jpg Photo

http://www.britannica.com/ebi/art-19392 Encyclopeadia Britannica story and diagram

http://www.thebakken.org/electricity/Leyden-jar.html A lightning rod umbrella is a very bad idea, don't you think?

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5.8 Sweaters, playground slides, and surgery rooms

This item is discussed in the book *The Flying Circus of Physics*, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=zeSTAbpQsQE</u> Video of child charged by sliding down plastic slide.

<u>http://www.youtube.com/watch?v=TjnNNwHqj8w</u> Another video of child charged by sliding down plastic slide.

http://www.youtube.com/watch?v=ICqwTZGuDDo Static charged seeds in a glass container

<u>http://www.youtube.com/watch?v=t0imJSsDAI8</u> Video, aluminum foil strips repel each other when they have the same sign of charge.

http://www.youtube.com/watch?v=GaY_uVjFcng Tongue-in-check use of static electricity

<u>http://www.youtube.com/watch?v=vZL0tSnzK_4</u> (mild cursing) static discharge from a carpet. Funny.I laughed out loud, for a long time.

<u>http://www.youtube.com/watch?v=0EiGEnTvtDg</u> Old television, Julius Sumner Miller, electrostatic toys and other toys

http://www.youtube.com/watch?v=PS_GnFnkuVo Comedy bit about static cling.

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5.9 Cars, fuel pumps, and pit stops

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.youtube.com/watch?v=DcFO7lQII8I&feature=related

http://www.youtube.com/watch?v=IdcPeW1XwKs&feature=related

Static discharge at a fuel station causes a fire. Note that she gets back in the vehicle, moves around, gets out, rearranges her clothing and then reaches for the pump handle. She was really charged by then.

http://www.metacafe.com/watch/729595/gas_station_fire_from_electrostatic_discharge_watch_y our_car/_same_video

http://www.youtube.com/watch?v=IdcPeW1XwKs&feature=related same video

<u>http://www.youtube.com/watch?v=BBkPT-j8PNg</u> Brainiac show, trying to use a cell phone to blow up a trailer doused with fuel

<u>http://www.youtube.com/watch?v=zv5wln3m2LY</u> explosion on a truck. Caution: the victim here eventually died from his injuries

<u>http://www.youtube.com/watch?v=1tYO4jvnJHw&feature=related</u> fuel fire apparently caused by static discharge

<u>http://www.youtube.com/watch?v=vt7Q_GektqQ</u> Video of Michael Shumacher pit stop fire during fueling, due to a spark

http://www.youtube.com/watch?v=KHPE5BknE3I Shumacher fire, shot from the inside

http://www.youtube.com/watch?v=1_bV5EUG9_0 Video of Eddie Irvine pit stop fire just after fueling, due to a spark

http://www.youtube.com/watch?v=W8GR-RvpVjQ Dramatic fire in a pit stop

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5.10 SHORT STORY: Shocking exchange of gum

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

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5.11 Danger of powder floating in the air

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http://www.nytimes.com/2008/02/09/us/09sugar.html News story from the New York Times, with photo

Videos

<u>http://video.google.com/videoplay?docid=5857379787822215553&q=silo+explosion&hl=en</u> Rapid burning of corn starch <u>http://www.youtube.com/watch?v=ctJf8BzqDUI</u> exploding flour <u>http://www.youtube.com/watch?v=uLjQ0nGvH2g</u> rapid burn of sawdust

Photos and discussions

http://www.landinstruments.net/combustion/products/coal_fire_detection/mill_fire_detector.htm http://www.rain.org/~mkummel/stumpers/10nov00a.html Flour explosion (scroll down)

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5.12 Danger of aerosol cans

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5.13 Danger of spraying water

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5.14 Ski glow

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5.15 Hindenburg disaster

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

Videos of original newsreel footage of the crash: <u>http://www.youtube.com/watch?v=F54rqDh2mWA</u> <u>http://www.youtube.com/watch?v=8V5KXgFLia4</u> Note the victims escaping from the fire

Photos:

http://flatrock.org.nz/topics/flying/assets/hindenburg.jpghttp://www.vidicom-tv.com/home/images/vidicom-main-hindenburg.jpghttp://www.airfields-freeman.com/NJ/Lakehurst NJ Hindenburg Hangar1 36.jpg

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5.16 A gurney fire

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5.17 Glow in peeling adhesive tape

This item is discussed in the book *The Flying Circus of Physics*, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.

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5.18 Parsley, sage, rosemary, and thyme

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http://www.youtube.com/watch?v=FWOst4VwwEU Video of Lichtenberg figures

http://205.243.100.155/frames/human LF2.jpg Photo of Lichtenberg figure in the lightning damage to a man's back, as described in Flying Circus

http://205.243.100.155/frames/longarc.htm#Large_LF Photos and discussion, big sparks, lightning

http://teslamania.delete.org/frames/coilgallery.html Click on any of the photos to enlarge them. http://www.orau.org/ptp/collection/Lichtenberg%20figures/Largemendonca.htm Photo and discussion of a Lichtenberg figure in a block of Lucite; the discharge was "heard several buildings away."

http://www.sgsmp.ch/lichtenberg.htm Lichtenberg: discussion and photos

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5.19 Wintergreen glow in the closet

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.metacafe.com/watch/331709/sugar emit green light in the dark/

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5.20 Earthquake lights

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

Photos and descriptions

http://nisee.berkeley.edu/elibrary/list?e=5440&start=1 http://www.spectrum.ieee.org/print/2367 Scroll down

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5.21 St. Elmo's fire and Andes glow

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=6rAX0YR0wvs</u> St. Elmo's fire as seen through the cockpit window on an airplane!

<u>http://www.youtube.com/watch?v=4sA-Hk_jnPg</u> Video of intense St. Elmo's fire on windshield of airplane and very scary moments for the flight crew.

http://www.youtube.com/watch?v=6ioN-3UWYrY Video. Note the lights off to the right.

<u>http://atmospherical.blogspot.com</u> Way cool blog site with lots of photos and descriptions. Go through the archived blogs by clicking on the button at the bottom of the page. The blog started in April 2006. A photo of St. Elmo's fire on a wing tip is given for May 3, 2006.

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5.22 High-voltage lines

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=9tzga6qAaBA</u> Video of man doing repair work on a high-voltage line while the line is live. He comes in a helicopter. Just watch the sparking.

<u>http://www.youtube.com/watch?v=uEKbMMHAwm0</u> Similar video but shot from the ground. <u>http://www.glumbert.com/media/highpower</u> Similar video

http://www.youtube.com/watch?v=eYUmdqQ94Ao Video of big flashover on power lines that are weighted down with ice and snow

http://www.youtube.com/watch?v=WHSBph71GX8 Repeated arcing and then explosion on a transformer.

<u>http://www.youtube.com/watch?v=PWDsjch4XTs</u> Flashover burns wood pole so badly that the top falls over

<u>http://www.youtube.com/watch?v=QdhExznMuME</u> Flashover and explosion of a transformer <u>http://www.youtube.com/watch?v=DPvonY2_kRY</u> Flashover video

http://www.youtube.com/watch?v=xkuXMeW2TQ4 Video: the arcing and burning of a truck after its crane has touched a power line

<u>http://www.youtube.com/watch?v=-Q7qATVBEW8</u> Video of sparks racing along power lines during flashover

http://205.243.100.155/frames/longarc.htm#Large_LF Photos and discussion, big sparks, lightning

<u>http://www.youtube.com/watch?v=CWHC6Twujdk</u> Controlled arc on high-voltage line <u>http://www.howeverythingworks.org/page1.php?QNum=1534</u> Bloomfield's answser to why birds on transmission lines are not killed.

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5.23 Current, voltage, and people

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=THT5al8kaLk&NR=1</u> Electric flash sets one of the two electricians on fire

http://www.search.com/reference/Electric_chair Photo of the first electric chair

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5.24 Short story: An act of indiscretion

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.youtube.com/watch?v=fDeGfWVp9sI&feature=related A prank by "friends"

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

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5.26 Surgical fires and explosions

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.youtube.com/watch?v=17uwTLEHTPM Training video

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5.27 Lemon battery, tingling of teeth fillings

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

To see me on television, go to <u>http://www.gumfrog.com/dailyplanet</u> and use Username: previewguest New Password: d1sc0very (use the number "1" and the number zero "0" instead of letters) Video 1 (electric pickle): choose Dec 2007. Scroll down to Dec 20 / 07 Click on "Fact of the Matter"

Videos on making a lemon battery <u>http://www.youtube.com/watch?v=AY9qcDCFeVI</u> <u>http://www.youtube.com/watch?v=PaLj9NPG-YI&mode=related&search</u>=

Videos on making a vinegar-salt battery <u>http://www.youtube.com/watch?v=V_P27iln1Qk</u> <u>http://www.youtube.com/watch?v=I1-82111tjY&mode=related&search=</u>

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5.28 Electric fish and eels

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.youtube.com/watch?v=AMPAhnXWz18&NR=1</u> Brief video of electric eels but no electric stuff

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5.29 Charging by blown dust, sand, and snow

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

Photos

http://www.nasa.gov/vision/universe/solarsystem/2005_dust_devil_prt.htm http://media.graytvinc.com/images/dust+devil.jpg http://www.gc.maricopa.edu/earthsci/imagearchive/dust_devils.htm

Video

http://video.google.com/videoplay?docid=899964669942411501&q=dust+devils&hl=en

Movies and other images of Martian dust devils

http://science.nasa.gov/headlines/y2005/14jul_dustdevils.htm http://antwrp.gsfc.nasa.gov/apod/ap050426.html http://www.msss.com/mars_images/moc/7_1_99_devils/ http://mars.jpl.nasa.gov/gallery/duststorms/ http://www.msss.com/mars_images/moc/lpsc2000/3_00_dustdevil/ http://www.lpl.arizona.edu/~lemmon/mer_dd.html

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5.30 Lightning-like discharges above a volcano

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://volcano.und.edu/vwdocs/volc_images/southeast_asia/indonesia/galunggung.html Photo of discharge above volcano in Indonesia

http://volcano.und.edu/pics/lightning.jpg Photo of discharge above volcano

http://glaciercaves.com/html/welcom 1.HTM Photo plus description Sakurajima volcano in Japan

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5.31 Bacterial contamination in surgery

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.youtube.com/watch?v=c5ZVyhwdNWk Video showing dust rearrangement on monitor due to charged finger

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5.32 Bees and pollination

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://en.wikipedia.org/wiki/Pollinator Photo and desciption

http://www.answers.com/topic/pollinator Photo and description

http://www.microscopy-uk.org.uk/mag/indexmag.html?http://www.microscopy-

<u>uk.org.uk/mag/artaug03/iwheath.html</u> Scroll down to the bee photo; note the pollen adhering to the head.

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5.33 Short Story: Fire ants and electrical equipment

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://pubs.caes.uga.edu/caespubs/pubcd/B1191.htm</u> Discussion plus photos; scroll down to the electrical equipment damage photo

http://www.cdfa.ca.gov/phpps/pdep/rifa/html/english/mediaroom/Resources.html Photos plus description. Click on the electrical box photo to expand it.

http://ipmworld.umn.edu/chapters/lockley/ant5.jpg Photo of fire ant stings to an arm. These ants are very dangerous.

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5.34 Plastic food wrap

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5.35 Flies on ceilings, geckos on walls

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

<u>http://www.nanooze.org/english/interviews/danielsoto.html</u> Photo: Gecko on wall, discussion with a graduate student

http://www.nrem.iastate.edu/ECOS/weblogs/NathanOLearly/Weblog1.html Photo: Gecko on wall

http://www.youtube.com/watch?v=2r4Wq0jmiRM Video of baby gecko on wall

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5.36 Meringue pie

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.atartec.co.il/atarchef/wp-images/lemon_pie.jpg Photo of a meringue pie

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5.37 Sauce béarnaise

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

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<u>http://www.youtube.com/watch?v=47iO09yegkw</u> Video about making the sauce <u>http://ericveren.com/food/sauces.asp</u> Photo plus description of making the sauce

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5.38 Lodestones

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The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

http://www.buylodestones.com/bigdemo.htm Photos http://www.pha.jhu.edu/dept/lecdemo/img/EM-g1a_400x300.jpg Photo http://www.teachersource.com/catalog/images/rm429.jpg Photo

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5.40 MRI complications

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http://www.chipple.net/mt/archives/20050616mri.jpg Photo of an MRI machine

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5.41 Short story: Magnetic search for the Garfield bullet

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5.42 Magnets, tattoos, and body jewelry

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5.43 Breakfast and cow magnetism

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http://demo.physics.uiuc.edu/LectDemo/scripts/demo_descript.idc?DemoID=1113 Photo of a cow magnet

http://www.luminet.net/~wenonah/new/magfield.htm Fields of a cow magnet and other magnets

http://www.metacafe.com/watch/yt-1nTRys771kQ/the_cow_magnet/ http://www.youtube.com/watch?v=1nTRys771kQ

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5.44 Electric guitars

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Video

<u>http://www.youtube.com/watch?v=QJ6B8bKKTS4&mode=related&search</u>= Jimi Hendrix at Woodstock "Let Me Stand Next to Your Fire"

<u>http://www.youtube.com/watch?v=5hSW67ySCio&mode=related&search</u>= Hendrix "Purple Haze"

http://www.youtube.com/watch?v=nLxhRwnFhag&mode=related&search= Hendrix "Hey Joe" Photo

http://www.cathedralstone.net/Pages/JimiHendrix.htm Jimi Hendrix, the master of the electric guitar

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5.45 Electric-guitar amplifiers

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

The material here is located at <u>www.flyingcircusofphysics.com</u> and will be updated periodically.

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5.46 Auroras

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http://www.youtube.com/watch?v=yRpY2zOn2hU&feature=dir Nice, short video http://www.youtube.com/watch?v=qIXs6Sh0DKs Video

http://www.metacafe.com/watch/890459/northern_lights_aurora_borealis_awesome_video/ Video from Anarctica

http://www.youtube.com/watch?v=jopsNu172YA&mode=related&search= Slide show

http://www.youtube.com/watch?v=YJBrMXSn-hU&mode=related&search= Video with explanation

http://www.youtube.com/watch?v=taLRQrNbipQ&mode=related&search= Video http://www.ptialaska.net/~hutch/aurora.html

Dick Hutchinson, aurora images and tips for photographing auroras

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5.47 Solar eruptions and power outages

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5.48 Levitating frogs

This item is discussed in the book *The Flying Circus of Physics, <u>second</u> <u>edition</u>, by Jearl Walker, published by John Wiley & Sons, June 2006, ISBN 0-471-76273-3.*

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http://www.youtube.com/watch?v=A1vyB-O5i6E Video

<u>http://www.radionetherlands.nl/features/science/magnets990813.html</u> Description and photo of levitating frog

http://www.youtube.com/watch?v=2FvWtEdY4sE water is diamagnetic

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5.49 Fizzing sound from a magnet

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http://www.youtube.com/watch?v=iWdbRX5Nyg4 http://www.youtube.com/watch?v=8-0UytwADgo&feature=related

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5.50 Currents in you at a train station

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