



WATTS

04-2015
Year 85 + 4m

Monthly Newsletter of the Pretoria Amateur Radio Club
Maandelikse Nuusbrieff van die Pretoria Amateur Radio Klub

PARC, PO Box 73696, Lynnwood Ridge 0040, RSA
<http://www.parc.org.za> @ zs6pta@zs6pta.org.za



Bulletins : 145.725 MHz on Sundays / Sondag at 08:45

Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz

Activated frequencies are announced prior to bulletins

Swopshop : 2m and 7.066 MHz live on-air after bulletins

Bulletin repeats on Mondays / herhalings op Maandae : 2m 19:45



SARL VHF/UHF Contest : Mark ZS6USA, Gawie ZS6GJM, Pierre ZS6PJH, Theo ZS6TVB and Pieter ZS6PA

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Next Events

Club Social Meeting :

Thursday 9 April at 7:00PM at SAM's

Club Committee Meeting :

Thursday 23 April at 7:00PM at SAM's

RAE Classes : Presented by Vincent Harrison ZS6BTY on Tuesday evenings from 19h00 – 21h00 at the Waterlab Training Room, 41 de Havilland Crescent, Persequor Park

PARC Committee Members / Komiteelede : 2014 – 2015

Chairman, Social & Rallies	Johan de Bruyn	ZS6JHB	zs6jhb@gmail.com	012-803-7385	079-333-4107
Vice Chairman	Jan Pienaar	ZS6OB	pienaarja@gmail.com		082-447-7823
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Fleamarket	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za		083-938-8955
Clubhouse	Pieter Fourie	ZS6CN	pieterzs6cn@gmail.com	012-804-7417	083-573-7048
Photographer, Technical	Theo Bresler	ZS6TVB	theo@bresler.co.za		082-698-1742
Auditor	Tony Crowder	ZS6CRO	tcrowder@telkomsa.net	011-672-3311	
Historian, Archives, Awards	Tjerk Lammers	ZS6P	zs6p@lafira.com	012-809-0006	
Secretary, WATTS newsletter	Louis de Wet	ZS6SK	louis.zs6sk@gmail.com	012-349-1044	072-140-9893
Contests	Jaco Cronje	ZR6CMG	jaco.cronje@moboxgroup.com		076-319-1057

Birthdays – April / Verjaarsdae – April



01 Melanie, daughter of Peggy and Ed ZS6UT
 08 Klasie, seun van Sylvia en Tjerk Lammers ZS6P
 19 Etienne Naude ZS6EFN

04 Dino Cottis ZS6DNO
 13 Liam, son of Heather and Vince ZS6BTY

Spouse's Birthdays - April

08 Bertha, sw of Hans Kappetijn ZS6KR
 10 Joey, sw of Graham Reid ZS6GJR
 15 Joanne, sw of Evan Seligmann ZS6ELI
 22 Marita, sw of Roy Alexander ZS6MI
 29 Heather, sw, of Vincent Harrison ZS6BTY

Anniversaries / Herdenkings - April

06 Andre ZS6BRC and Lyn van Tonder
 10 Evan ZS6ELI and Joanne Seligmann
 30 Graham ZS6GJR and Joey Reid

Please Note : If your Club fees are not paid up to date, birthday details will not be displayed in Watts

Lief en Leed / Joys and Sorrows

Bertha, the Wife of Hans Kappetijn is back home after hospital treatment
 Fritz Sutherland ZS6SF is recovering well from a back operation
 Jan (Pine) Pienaar ZS6OB is showing good recovery after medical treatment
 Lyn, the sw of Andre van Tonder ZS6BRC is recovering well at home after hospital treatment
 Mollie Peer ZR6MOL is in hospital receiving treatment. A speedy recovery is wished to her. Our support to Richard.

Contests and Diary of Events – April 2015 / Kompetisies en Dagboek van Gebeure – April 2015 (UTC Times)

02	SARL 80m QSO Party : 19h00 – 22h00
04	SARL RADAR Contest : 0h00 – 24h00
05 - 06	SP DX Contest : 15h00 – 15h00
11	SARL Autumn QRP Sprint : See SARL website for more details
12 - 13	JIDX CW Contest : 07h00 – 13h00
13	Hungarian Straight Key Contest : 15h00 – 17h00
17 – 19	SARL National Convention : Bloemfontein : See SARL website
18	World Amateur Radio Day
18 - 19	Holyland DX Contest : 21h00 – 21h00
19	EU Spring Sprint SSB : 16h00 – 19h59
19 - 20	YU DX Contest : 12h00 – 17h00
26 - 27	10-10 International Spring Digital Contest : 00h01 – 23h59
26 - 27	SP DX RTTY Contest : 12h00 – 12h00
26 - 27	Helvetia Contest : 13h00 – 12h59

PARC SUBS / LEDEGELD FROM / VAN 30-06-2014

Bank	First National Bank	Ordinary Members / Gewone Lede : R150 Spouses / Pensioners : R50	Your call sign must appear as statement text!
Branch Code	25 20 45		
Account No	546 000 426 73		

**Please remit your subs in time to our Treasurer, or pay per transfer into the PARC account
 Betaal asb. u ledegelde betyds aan ons Tesourier, of betaal per oorplasing in die PARC rekening**

SARL VHF / UHF Competition : 21-22 March

The SARL VHF/UHF competition was held on the 21st – 22nd of March. PARC members Theo Bresler ZS6TVB, Pierre Holtzhausen ZS6PJH, Pieter Human ZS6PA, Mark Lukinovich ZS6USA and Gawie Marais ZS6GJM set up a field station at the Scouts camping site, bravely participating with thunderstorms not making life easy at all. PARC sincerely thanks these gentlemen for their hard efforts under extreme and dangerous conditions.



SSC East Rand Rally : 21 March

The SCC East Rand Rally took place on the 21st of March in the Heidelberg – Nigel region on the East Rand. Consisting of 8 stages, the rally started and ended at the Rooikraal shooting range on the R103 to Alberton. The radio support team consisted of Andre van Tonder ZS6BRC (Control), Johan de Bruyn ZS6JHB (Roving), John ZS6JAO (Mobile 1), Tony Crowther (ZS6CRO), David Brown ZU6DB (Sweep) and Louis de Wet ZS6SK (Chief Radio). The field stations were manned (and wifed) by Pieter Fourie ZS6CN and sw Annatjie, Willie Greyling ZR6WGR and sw Sarina, Pieter Myburgh ZS6PAM and sw Irene and Pierre Britz ZS6ADZ.

Of course, no rally goes without incident. As you can see from the photographs, the weather, and particularly hard thunderstorms ensured some muddy action along the stages, with Stage 6 being cancelled. Willie “thunderbolt” received a direct lightning hit on his field mast, but miraculously did not suffer any damage on his radios, while Louis “off-the-road” had a high speed slip and slide, fortunately with no damage to his vehicle.



Photographs by Willem Sander and Willie Greyling ZR6WGR

D-STAR : Digital Smart Technology for Amateur Radio

In the previous edition of Watts, an explanation was provided on the characteristics elements of the D-STAR system. In this edition, a short overview is presented below of the features of some D-STAR capable Icom Mobile- and handheld radios. Quite a large range of mobile- and handheld transceivers are available, and can be viewed in more detail on <http://www.icomamerica.com> .

Transceiver	Frequencies	Power Output	Notes
 ID-1	1.2 GHz	10W	Both DV and DD modes available PC remote control software included Separate remote controller and speaker
 IC-2828H	144/430 (440) MHz Dual Band	50W	Wideband receiver with dual watch capability D-STAR + GPS receiver capability (UT-123 required)
 ID-880H	144/430 (440) MHz Dual Band	50W	D-STAR repeater (DR) mode operation Free download cloning software, CS80/880 Detachable front panel
 IC2200H	144MHz	65W	207 memory channels Simple operation
 IC-91AD	144/430 (440) MHz Dual Band	5W	V/V, U/U dualwatch receive capability Optional PC remote control software
 IC-80AD	144/430 (440) MHz Dual Band	5W	D-STAR repeater (DR) mode operation Optional HM-189GPS GPS Speaker Mic. Free download cloning software CS-80/880
 IC-U82	144/430 (440) MHz Dual Band	5W / 7W	7W output power (IC-V82) 5W output power (IC-U82) 200 memory channels

<http://www.icomamerica.com/en/products/amateur/dstar/dstar/default.aspx>



New on the market, The Icom IC-2300H, which is a worthy successor of the IC-2200H, is a popular high power 2 meter mobile rig, according to a review by Mark J. Wilson, K1RO, k1ro@arrl.org . For a full review, the pdf file can be downloaded from the address below. Classified as a "workhorse", this smaller unit provides power output at 65W, 25W, 10W and 5W. The unit has 200 memory channels, and various scan types are supported for maximum reception and ease of use.

For more information on this transceiver, the Icom website can be visited at the following addresses:

http://www.icomamerica.com/en/products/amateur/mobile/2300H/2300H_QSTProductReview.pdf

<http://www.icomamerica.com/en/downloads/DownloadDetails.aspx?Document=565>

Jan (Pine) Pienaar ZS6OB

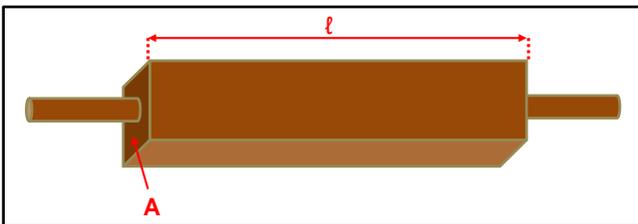


Recently, ee-publishers published an article "First radio ham in Africa to be awarded DXCC. This short article is a synthesis of the original. Being a being Radio Ham since 1981, Jan (Pine) Pienaar recently became the first radio ham in Africa to hold a DXCC (DX Century Club) with all contacts made by EME (Earth-Moon-Earth) or bouncing signal off the moon. The only other similar achievement in the southern hemisphere was by ZL3TY, a New Zealand station in 2013. Only a handful stations in Europe and the USA have achieved a similar DXCC on 144MHz EME. Jan is well known for his EME DX-pedition to Lesotho, and is currently planning two similar EME-expeditions to Swaziland and Mozambique. Pine is constantly working on improving his EME station, and has installed a sensor to measure the elevation of his antenna. PARC wishes Jan all the best with his EME ventures.

<http://www.ee.co.za/article/first-radio-ham-in-africa-to-be-awarded-dxccfirst-amateur-radio-ham-in-africa-to-be-awarded-dxcc.html>

Conductivity and Resistivity : by Louis de Wet ZS6SK

Electrical Conductance (EC), in contrast with Electrical Resistance, is simply the ease with which an electric current passes through a conductor. Electrical resistivity, as we have all learned from Ohm's Law, is the intrinsic property of a material which quantifies how strong a current flow is opposed. EC or Specific Conductance, which is the reciprocal of Electrical Resistivity, is the measure of a material's ability to conduct an electric current. Therefore, if a material has a high EC, it will naturally have a low resistivity, and will have the ability to allow free movement of electric charge. EC is commonly represented by the Greek letter σ (sigma), while resistivity is represented by ρ (rho). The SI unit of electrical resistivity is the ohm.metre ($\Omega \cdot m$), while ohm.centimetre ($\Omega \cdot cm$) is also used.



Generally, conductors and resistors are homogenous with regards to composition and electron flow (see diagram). Under these circumstances, Electrical Resistivity is defined as:

$$\rho = R \cdot (A/l)$$

Where: R = Electrical Resistance (Ω)
 l = length of conductor (m)
 A = area of cross section of conductor (m^2)

The reason for this definition is that it makes resistivity an intrinsic property, unlike resistance. Hence, all copper or other wires, irrespective of their shape and size, have the same resistivity. However, a long long, thin copper wire has significantly more resistance than a thick, short piece of copper wire. Therefore, every material has its own characteristic resistivity – the resistivity of teflon will be much greater than that of iron.

As mentioned, the resistance of a conductor will increase with length, but decrease if the cross-sectional area is increased. The above formula $\rho = R \cdot (A/l)$, or $R = \rho l/A$ can be used to understand the meaning of the resistivity value. Hence, if $A = 1m^2$, and $l = 1m$ (a cube with perfectly-conductive contacts on opposite faces), the resistance of this cube in ohms is numerically equal to the resistivity of the material it is made of in ohm-meters. Similarly, a 1 ohm.cm material would have a resistance of 1 ohm if contacted on opposite faces of a 1cm x 1cm x 1cm cube. Conductivity (σ – sigma) on the other hand, is defined as the inverse of resistivity : $\sigma = 1/\rho$. The SI unit for Conductivity is Siemens per meter (S/m). The conductivity of liquids such as water is also expressed in the unit mS/m, which has a specific relationship to the amounts of salts (Total Dissolved Solids – TDS) dissolved in water.

Below are characteristic resistivity and conductivity values of some common materials, illustrating the the differences between conductors, insulators and semi-conductors. Some interesting

definitions of Conductance, Conductivity, Resistance and Resistivity are given below (Source: CRC Handbook of Physics and Chemistry: 65th Ed. 1985).

Resistivity and Conductivity values of some materials at 20°C

Material	ρ ($\Omega\cdot\text{m}$) at 20°C	σ (S/m) at 20°C	Material	ρ ($\Omega\cdot\text{m}$) at 20°C	σ (S/m) at 20°C
Silver	1.59×10^{-8}	6.30×10^7	Carbon (graphite)	$2.50 \times 10^{-6} - 5.00 \times 10^{-6}$	$2.00 \times 10^5 - 3.00 \times 10^5$
Copper	1.68×10^{-8}	5.96×10^7	Germanium	4.60×10^{-1}	2.17
Gold	2.44×10^{-8}	4.10×10^7	Sea Water	2.00×10^{-1}	4.80
Aluminium	2.82×10^{-8}	3.50×10^7	Drinking Water	$2.00 \times 10^1 - 2.00 \times 10^3$	$5.00 \times 10^{-4} - 5.00 \times 10^{-2}$
Zinc	5.90×10^{-8}	1.69×10^7	Silicon	6.40×10^2	1.56×10^{-3}
Nickel	6.99×10^{-8}	1.43×10^7	Deionized Water	1.80×10^5	5.50×10^{-6}
Iron	1.00×10^{-7}	1.00×10^7	Glass	$10.0 \times 10^{10} - 10.0 \times 10^{14}$	$10^{-11} - 10^{-15}$
Platinum	1.06×10^{-7}	9.43×10^6	Hard Rubber	1.00×10^{13}	10^{-14}
Tin	1.09×10^{-7}	9.17×10^6	Air	$1.30 \times 10^{16} - 3.30 \times 10^{16}$	$3 \times 10^{-15} - 8 \times 10^{-15}$
Lead	2.20×10^{-7}	4.55×10^6	Fuzed Quartz	7.50×10^{17}	1.30×10^{-18}
Mercury	9.80×10^{-7}	1.02×10^6	Teflon	$10.0 \times 10^{22} - 10.0 \times 10^{24}$	$10^{-25} - 10^{-23}$

- **A conductor (metal) has a high conductivity and a low resistivity**
- **An insulator (glass, teflon, etc.) has a low conductivity and a high resistivity**
- **Any semiconductor has a conductivity which is intermediate, but varies under varying conditions such as electric fields, specific frequencies of light and temperature**

Conductance is the reciprocal of resistance, and is measured by the ratio of the current flowing through a conductor to the difference of potential between its ends. The practical unit of conductance, the mho, is the conductance of a body through which 1 Ampere of current flows when the potential difference is 1 Volt. The conductance of a body in mho is the reciprocal of the value of its resistance in ohms. Dimensions: $[\epsilon \text{ l t}^{-1}]$, $[\mu^{-1} \text{ l}^{-1} \text{ t}]$

Specific Conductance σ_{sp} or conductivity of a conductor of electricity is the conductance of a material between opposite sides of a cube, 1cm in each direction. The unit of specific conductance is $\text{ohm}^{-1} \text{ cm}^{-1}$ or mho cm^{-1} .

Electrical Conductivity, the reciprocal of resistivity, is measured by the quantity of electricity transferred across an unit area, per unit potential gradient per unit time. Volume conductivity, or specific conductance, $k = 1/\rho$, where ρ is the volume resistivity. Mass conductivity = k/d , where d is density. Equivalent conductivity $A = k/c$, where c is the number of equivalents per unit volume of solution. Molecular conductivity $\mu = k/m$, where m is the number of moles per unit volume of solution. Dimensions - volume conductivity: $[\epsilon \text{ t}^{-1}]$, $[\mu^{-1} \text{ l}^{-2} \text{ t}]$, mass conductivity: $[\epsilon \text{ m}^{-1} \text{ l}^3 \text{ t}^{-1}]$, $[\mu^{-1} \text{ m}^{-1} \text{ l t}]$

Resistance is the property of conductors, depending on their dimensions, material and temperature which determines the current produced by a given difference of potential. The practical unit of resistance, the Ohm, is that resistance through which a difference of potential of 1 Volt will produce a current of 1 Ampere. The international Ohm is the resistance offered to an unvarying current by a column of mercury at 0°C; 14.4521g in mass, of constant cross sectional area and 106.300 cm in length, sometimes called the legal Ohm. Dimensions: $[\epsilon^{-1} \text{ l}^{-1} \text{ t}]$, $[\mu \text{ l t}^{-1}]$

Resistivity (ρ) is a characteristic proportionality factor equal to the resistance of a centimeter cube of a substance to the passage of an electric current perpendicular to two parallel faces. Also called resistance: $R = \rho(l/A)$, where R is the resistance of a uniform conductor, l is its length, A is its cross-sectional area, and ρ is its resistivity.

Resistance of a conductor at 0°C, of length l , cross section s , and specific resistance ρ :

$R_0 = \rho l/s$, where resistivity is expressed as ohm-cm when R is in ohms, l in cm, and s in cm^2 . Resistance of a conductor at a temperature t whose resistance at 0°C is R_0 and whose temperature resistance coefficient is α :

$$R_t = R_0(l + \alpha t).$$

New Horizons mission to Pluto: Launched 9 years and 3 months ago, the new Horizons spacecraft will be approaching Pluto during the next couple of months, for a first close-up fly-by on the 14th of July, 2015, approximately 7.5 billion kilometers from earth. For this historic and scientific significant event, Watts will keep you posted with news and photographs as New Horizons nears the exoplanet Pluto.

PARC Flea Market : 28 March 2015

The first Flea Market for 2015 was held on the 28th of March at the Pretoria Motor Club, Silverton. The Flea Market was well supported with lots of tables loaded with equipment and components for sale. A display by the Antique Wireless Association created an elegant touch to the event. Members from the ERB, West Rand and Kempton Park Clubs also attended the Flea Market – thank you very much for your support. A special thanks to Almero du Pisani ZS6LDP who organised the Flea Market, and to Johan ZS6JHB, Pieter ZS6CN and Louis ZS6SK who helped out with the sausage rolls and coffee.



SASOL Rally : 17-18 April 2015



The 24th SASOL Rally will take place on the 17th – 18th of April in the forests of Sabie, Graskop, Nelspruit and Witrivier, Mpumalanga. Pretoria Amateur Radio Club will be well represented with Club Members assisting at the various stages as Control, Mobile, and field stations. For more details on the Rally, please contact Johan de Bruyn at 079-333-4107 or zs6jhb@gmail.com . More information can be found at www.sasolmotorsport.co.za .

SARL National Convention : 17 – 19 April 2015

The 2015 South African Radio League National Convention is hosted by the Bloemfontein Amateur Radio Club, and will be held at the Bloem Spa Hotel and Conference Centre (www.bloemspa.co.za : GPS: S 29.05445 E 26.20033. ZS90SARL on the air will take from 13 to 19 April also from Bloemfontein. Upon arrival Friday, delegates will be treated with a visit to the Digital Planetarium on Naval Hill, followed by a dinner at the hotel. Costs for the Planetarium visits are R50 per person, and R30 per pensioner. Please visit www.sarl.org.za for more information.



After the SARL AGM on Saturday morning, various speakers will do presentations at the Convention, which include:

- WISPR and the SARL 5 MHz Propagation Research Project
- What to do with QSL cards
- Basic Overview of N1MM+ Contest Logging Software
- Regulatory issue - an update

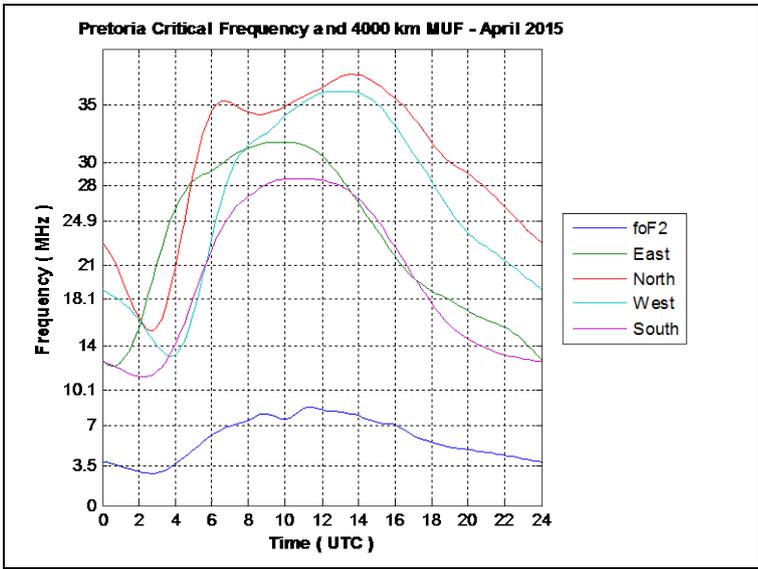
The presentations will be followed by the SARL 90th Anniversary Awards Dinner, where the guest speaker will be Prof. Matthiam Hoffman of the Boyden Telescope.

World Amateur Radio Day : 18 April 2015

The 18th of April 2015 celebrates World Amateur Radio Day. It is on this date in 1925 that the International Amateur Radio Union (IARU) was formed in Paris. Amateur Radio experimenters were the first to discover that the short wave spectrum could support worldwide propagation. In the rush to use these shorter wavelengths, Amateur Radio was “in grave danger of being pushed aside”, the IARU's history has noted. Amateur Radio pioneers met in Paris in 1925 and created the IARU to support Amateur Radio worldwide.

At the International Radiotelegraph Conference in 1927, Amateur Radio gained the 160, 80, 40, 20 and 10 meter allocations, which are still recognized today. Since then, the IARU has worked tirelessly to defend and expand the frequency allocations for Amateur Radio. Due to their efforts, radio amateurs are now able to experiment and communicate in frequency bands strategically located throughout the radio spectrum. Since the inception of the IARU where it was formed by 25 countries, this organization has grown to include 160 member societies in three regions, which include Region 1 (Europe, Africa, Middle East & Northern Asia), Region 2 (Americas) and Region 3 (Australia, New Zealand, Pacific Islands and Asia). Today, Amateur Radio is more popular than ever, with more than 3 million licenced operators! <http://www.iaru.org/world-amateur-radio-day.html>

A poster for World Amateur Radio Day. At the top, it says '18 APRIL 2015' and 'WORLD AMATEUR RADIO DAY'. Below this, there are translations of the name in Arabic, Spanish, Russian, and Chinese. The main text reads 'Global Communication and Friendship for All'. The central image shows a person wearing a headset and operating a radio station, with a globe in the background. At the bottom, there is a URL 'WWW.IARU.ORG/WORLD-AMATEUR-RADIO-DAY' and a logo for '150 ITU & IARU: Celebrating 150 Years of Advancing the Telecommunication Art'.



Long Term HF Propagation for April 2015

DX Operating

The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum F-layer frequency for short range communications.

See also the Propagation tab at <http://www.parc.org.za/>

Courtesy Vincent ZS6BTY

C/O NELSPORT & 801 MALMESBURY STR, WINGATE PARK, PRETORIA [S25.49.36 & E28.16.07]

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DIAMOND. THE HARDEST PHONOGRAPH NEEDLE IS ALSO THE GENTLEST AND SAFEST FOR RECORDS.

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Everything in product development these days is about connectivity. One company just came out with a new silent smoke alarm. When it detects smoke it sends you a text, tweets your friends, and posts a picture of the fire on Facebook.

Two electrical engineers met, fell in love and were married. They loved and encouraged their children, and always gave them the most expensive of gifts. One day, when their oldest was approaching his 10th birthday his mother asked "What would you like for your birthday?" He responded, "Anything but another oscilloscope."

Chief engineer: You told me that you would finish the layout in three days.

Engineer: Sure, but not three consecutive days!

"Did you hear about the company that sells elastomeric insulators? Their motto is "Resistance is butyl!"

By Hans ZS6KR

"The scientists of today think deeply instead of clearly. One must be sane to think clearly, but one can think deeply and be quite insane."

Nikola Tesla

The scientific man does not aim at an immediate result. He does not expect that his advanced ideas will be readily taken up.

His work is like that of a planter - for the future.

His duty is to lay foundation of those who are to come and point the way.

Nikola Tesla

I don't care that they stole my idea I care that they don't have any of their own

- Nikola Tesla