

# The PROPAGATOR

August, 2001

The Monthly Newsletter of South Orange Amateur Radio Association

## ARRL - The Inside Scoop

At the recent ARRL Board meeting, decisions were made that will affect Amateur Radio in Southern California. Our ARRL Vice Director, Art Goddard, W6XD, participated in that Board meeting and will give SOARA members (and guests) the inside scoop on what happened. ARRL elections are coming up this fall for Director and Vice Director - come to this month's meeting so you can be an informed voter!

Art Goddard, W6XD, earned his Novice class license in 1956. He worked his way up the ranks to Extra class. Art is active on the air, working VHF, Repeaters, DX, contests, and satellites. A noted photographer, Art uses his camera to capture the spirit of adventure and international friendship during his trips to exotic DX locations. He shares these experiences at radio club meetings and conventions. Art is a Life Member of ARRL, currently serving as our Vice Director for the ARRL Southwestern Division (Southern California and Arizona). His mission is to promote and protect Amateur Radio. Art is a consultant and is retired from Boeing (formerly Collins Radio and Rockwell).

### SKYWARN talk a hit at SOARA

A warm thanks to Fred Coe, WA0RTO, and our own Phil Pacier, AD6NH, for July's presentation on the SKYWARN weather reporting and tracking system. If you have any interest in becoming involved in the program — or just want more information — see Phil.

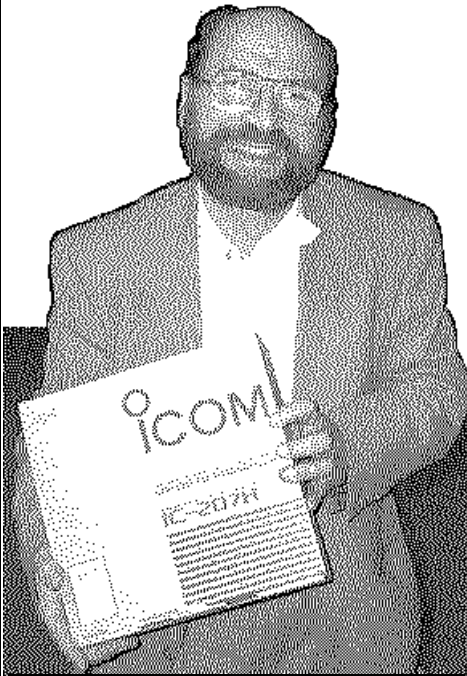
Fred gave an interesting and informative overview of the organization and operation of the service and its relationship to the National Weather Service. Phil related some of his experiences and the use he has made of APRS (Automatic Packet Reporting System) in connection with his SKYWARN duties in Southern California.

## Picnic, Food & Fun

The annual SOARA picnic was held on Saturday, August 4. We captured our regular site, thanks to Paul, NZ1M, who got there before sunrise to stake our claim. Ah the varied duties of a president. Thanks from all for your dedication.

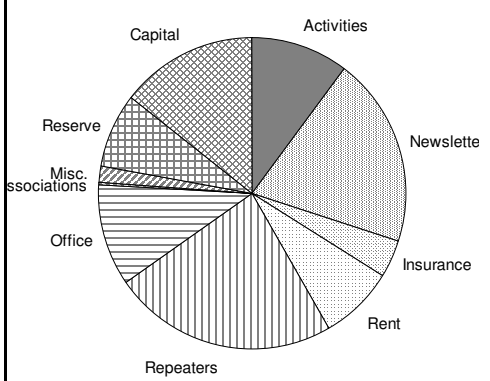
In addition to the hamburgers and hot dogs provided by the club, were some fabulous salads and (my personal favorite!) deserts.

A rig and antenna were set up by Heiko, AD6OI, and several contacts were made. The radio activity brought some onlookers and the opportunity to expose them to the magic of Amateur radio.



Another smiling face. This one belongs to SOARA member John Anderson, NJ6A, proud winner of the ICOM IC-207 from the June \$5.00 Raffle. Will you be the next lucky ticket holder?

## Matters Financial



SOARA's board has approved a budget for next year and has realigned the dues structure. As expected, the Advanced Access as a separate charge was dropped, and all members will have full access privileges on all of SOARA's repeaters. In order to keep a healthy budget, the board decided on an annual dues of \$42.00 per year. Dues letters are sent out in mid-September and payment is due in October. A grace period extends until the end of December. For this year, although the dues will officially be set at \$42, a special discount will be applied for payments received before December 31, 2001. With this one time discount, the dues will be only \$36.00. The initiation fee for new members will remain at \$50.00.

Year	% from Adv. Acc.	Average dues + fees
1996	60%	\$54.00
1997	56%	\$51.00
1998	52%	\$50.00
1999	46%	\$47.00
2001	23%	\$35.5

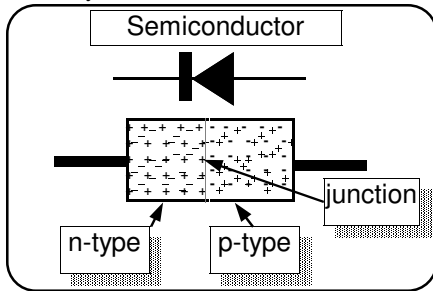
The table above shows the average dues (plus fees) paid for the past few years, and gives an indication of the drop in demand for Advanced Access.



## The Way I See It: Understanding Radio Theory Without

On October 7, 1884, professor Edwin J. Huston presented the first paper before the newly established American Institute of Electrical Engineers in Philadelphia. The paper was modestly titled, "Some Notes on Incandescent Lamps" and dealt with what is known as the "Edison effect." This effect refers to the flow of current between a hot filament and a plate within an evacuated bulb. Fleming would later make a practical device — the Fleming valve (or diode) using this effect and in doing so ushered in the electronics era.

This early diode was useful because it



allowed electrical current to flow in one direction only. This allowed it to be used as a detector in a radio set.

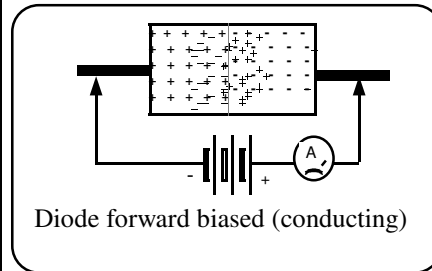
Today solid state devices have replaced most vacuum tubes, and vacuum tube diodes are now pretty rare. We will take a look at solid state diodes and at how they work. In doing so we will discover that an amazing array of applications have been developed for these modest two terminal devices.

An understanding of the semiconductor diode requires the use of the modern view of matter as made up of atoms. An atom consists of a central nucleus having a positive charge (depending on the number of protons). Orbiting this tiny nucleus are a number of electrons. In order to be electrically neutral there is one electron in orbit for each proton in the nucleus. As we go from element to element in the chemist's periodic table we add protons, and the corresponding electrons. Each element has a characteristic number of

protons.

What makes the Periodic Table periodic is the existence of electron "shells" — numbers of electrons that are somewhat magic in that atoms like to have full shells. An atom may readily shed, steal, or share electrons in order to have its outer shell complete.

This picture of atoms is useful in



understanding the properties of some types of materials. For instance metals freely part with one or more outer electrons. This will, of course, leave the atom with a positive charge so the attraction between the atom and an electron still exists. A cluster of such atoms and the cloud of (relatively) free electrons can form a solid material held together by electrical attraction. It can readily conduct electricity by a flow of the free electrons. Conductivity (the inverse of resistance) is directly proportional to the number of free electrons. Metals readily conduct heat, also via its cloud of electrons. Metals are malleable, the atoms don't care who the neighbors are. It is the cloud of electrons which holds the metal together.

Quite a different material is represented by Silicon. The Silicon atom has four of a possible eight electrons in the outer shell. It forms a solid by sharing electrons with its four nearest neighbors. Thus all of the electrons are tightly bound and the directions to each of the four neighbors is rigidly fixed. Don't try to bend a Silicon bar.

By adding a very small percentage of impurity atoms we can impart some conductivity to the silicon. We choose impurity atoms with either 3 or 5 outer electrons. An extra electron will not be tightly bound and can move through the Silicon lattice. We call this material an n-type semiconductor because **negative** carriers (electrons) are free to move. If the impurity atoms are short one electron we are left with a "hole" into which an electron from another location can reside temporarily. We call this

a p-type semiconductor because the charge carriers are positive "holes".

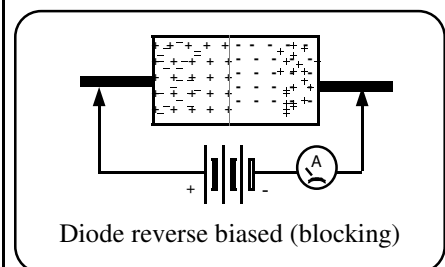
This situation is much like a class room of students sitting at desks. If a child is missing so that there is an empty desk and the children are inclined to change desks then it is easier to keep track of the motion of the empty desk than of all the children.

For an n-type semiconductor we can picture a lattice of fixed positive charges (the ionized impurity atoms) and mobile negative charges. Just the opposite case holds for a p-type semiconductor. The figures show the fixed charges (atoms) as a regular array of bold symbols. The mobile carriers (electrons or holes) are indicated by lighter symbols in random positions.

Let us make a two terminal device by attaching wires to a piece of Silicon which is half p-type and half n-type as shown in the figures. We find that it acts much like the Fleming diode. A voltage applied in what we will call the forward direction will result in a current flow through the diode.

From the figure we can see that the oppositely charged movable charges will be forced toward the interface, or junction, between the two types of material. They are free to flow in this direction and annihilate each other at the junction. (The electrons fill the holes.) We have relatively unrestricted current flow.

With a voltage applied in the reverse (non-



conducting or blocking) direction the carriers are pulled away from the junction and since no carriers cross the junction there is no current flow. If the applied voltage is strong enough it can tear loose carriers that are otherwise bound to atoms and we have a current flow due to "breakdown." Often this will destroy the diode.

Next month we will look at the amazing variety of applications for the semiconductor diode.

Year 2001	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
<b>General Meeting</b> 7:00 PM	22	26	19	16	21 Auction	18	16	20	17	15	19 Auction	No meeting
<b>VEC Testing</b> 5:30 PM	22	—	19	—	21	23	16	—	10	—	19	—
<b>Propagator Deadline</b>	6	10	3	1	5	2	1	4	1	9/29	3	2
<b>Board Meeting</b>	29	3/5	26	23	TBA	25	23	27	24	22	26	
<b>Spring Auction</b>					21							
<b>ARRL Field Day</b>						23 - 24						
<b>SOARA picnic</b>								4				
<b>Fall Auction</b>											19	
<b>SOARA Holiday Party</b>												2

**SOARA offers Tech Class**

Starting the 15th of this month SOARA will offer another introductory level class. It will meet at the Community Center on Wednesdays from 7:00 PM to 9:00 PM.

Classes will be taught by experienced club members following the ARRL publication "Now You Are Talking". This course has been given several times in the past years and has been quite successful in terms of preparing students to pass the FCC exam.

If you know anyone who is interested in working on their license, please contact SOARA's Education Director, Mike Mullard, KF5HVO. He can be reached via e-mail at [kf6hvo@soara.org](mailto:kf6hvo@soara.org)



**Fort Tutthill Hamfest, 2001**

By Richard, WW7D

For the past several years I have made the trip to Flagstaff to attend the annual Hamfest at the Ft. Tutthill State fairgrounds. This July 27-29, a ham friend and I made the trip. It is an easy day's drive from Southern California with stops for food and fuel. The heat is very noticeable crossing the low desert, especially near the Colorado river. We checked in at the "Flag-Ritz" (Motel 6) which is located in a nice central spot.

Early Friday morning we checked out the commercial sellers, who were doing a brisk business, and the swap meet, which was not as busy as past years. I did not see any great bargains. Oh well, the best reason for going is to get away and relax. The location at 7500 ft elevation amid a super forest of

tall pines is relaxing. The weather was beautiful, the air seemed fresh and clean. The days were comfortable, in the 80s. At night it gets cooler with very clear skies. We went to the nearby Lowell Observatory and saw the Clark 24" telescope in operation.

In addition to the Hamfest activities on Saturday we explored the area north of Flagstaff. There we toured the volcano park and saw Indian ruins. On Sunday morning, after failing to check into SOARA's Sunday morning 40 meter net, we drove 30 miles east to Williams, AZ. There we took the 100 year old Steam Train 65 mile to the Grand Cannon south rim. While there we took a bus tour with lunch at one of the lodges. The train took us back to Williams where we spent the night before returning home on Monday.

**BUDGET** Continued from page 1.

The Pie chart on page 1 gives an indication of the distribution of funds in the adopted club budget for next year. It does not represent a dramatic change from previous years. The dollar amounts are shown in the table to the right.

"Activities" includes Field Day, the picnic, etc. The cost of "repeaters" includes the estimated cost of routine repairs and utilities (phone lines). "Office" expenses include printing and mailing of election ballots and dues notices. The item "Associations"

Activities	\$855
Newsletter	\$1630
Insurance	\$327
Rent	\$640
Repeaters	\$1950
Office	\$864
Associations	\$40
Misc.	\$128
Reserve	\$640
Capital	\$1200
<b>Total</b>	<b>\$8274</b>

includes the dues for relevant spectrum control organizations. The item labeled "Reserve" is to cover unexpected expenses or increases. "Capital" is money that goes into a fund for future capital equipment expenses. Future replacement or acquisition of new equipment for the repeaters will be paid for out of this fund.

This budget is little changed from those of previous years. SOARA has been fortunate in being able to keep expenses low and has concentrated on areas to maximize services for the members.

# The PROPAGATOR

South Orange Amateur Radio Association  
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Mission Viejo, CA 92690

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**Meeting: Monday, 8/20/01 at 7:00 PM.  
Program: Art Goddard, W6XD**

☛ **SOARA** meets at the Mission Viejo Community Center, 26932 Veterans Way, Mission Viejo, the third Monday of every month at 7:00 PM. Changes to the meeting time or place are announced in this newsletter and on the two-meter repeater.

☛ **License Exams:** Amateur License Exams are given prior to most SOARA meetings. Exams are from 5:30 to 7:30 PM. You must make an appointment at least a week in advance. Call Lou Parker, KA6BJO, at 951-0336. (No calls after 9:00 PM please.)

☛ **Contacting SOARA:** Questions about SOARA? Send e-mail to: [info@soara.org](mailto:info@soara.org), or leave a message at 949-249-1373.

☛ **Web Site:** SOARA maintains a web site with current club information. The URL is: <http://www.soara.org>.

☛ **Repeaters:** The SOARA 2-meter and 70 cm repeaters are open to all licensed hams.

SOARA 2m — 147.645 - (110.9)

SOARA 2m — 145.240 - (110.9)

SOARA 440 — 445.660 - (110.9)

The SOARA 220 and HROC 440 repeaters are shared by members of both clubs. Each machine is subject to the operating rules of its respective club. Call KG6GI for details.

SOARA 220 — 224.100 - (110.9)

SOARA 220 — 224.640 - (123.0)

HROC 440 — 447.180 - (131.8)

☛ **Nets:** SOARA 2 m repeater open net is held Tuesday 8:00 PM 40 meter HF net (7.263 MHz +/- for QRM), Sunday 7:30 AM PSK-31 net: 28.120 USB 1 KHz meets Fridays at 6:00 PM.

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