

# SCFS FORUM

Southern California Federation of Scientists

"Science in the Public Interest"

Volume 44 No. 1

Fall

1995

## SCFS OFFICERS

### **CHAIR:**

RILEY GEARY, Seismic Analyst

### **VICE CHAIR:**

FLEUR YANO, Physicist

### **SECRETARY:**

NABIL ELGABALAWI, Electrical Engineer

### **TREASURER:**

TAYLOR TROWBRIDGE, Optical Physicist

## EXECUTIVE BOARD

THOMAS AMNEUS, Civil Engineer

JOHN BACHAR, Jr., Mathematician

FRED B. BLAIR, Electronics Engineer

GEORGE CARLISLE, Aerospace Engineer

FLORA DAVIS, Chemist

ROGER DITTMANN, Physicist

DAN HIRSCH, Community Organizer

ROBERT M. NELSON, Astronomer

SHELDON C. PLOTKIN, Systems Engineer

BENNETT RAMBERG, Political Scientist

JAMES C. WARF, Chemist

Founded in 1951 as the Los Angeles Chapter of the Federation of American Scientists, the Southern California Federation of Scientists is a non-profit educational organization dedicated to issues affecting SCIENCE, SOCIETY and PUBLIC POLICY. The **FORUM** is intended as a communications vehicle among our members and readers. We hope that our readers will send their comments and debate one another on the issues of the day. Please contact or send all materials to:

**SCFS**  
3318 Colbert Ave., Suite #200  
Los Angeles, CA. 90066  
(310) 390-3898

## Walter Cobb

SCFS mourns the death of Walt Cobb on June 18, 1995. A memorial service was held on July 16 but circumstances prevented the SCFS office from notifying members. Walt is survived by his wife, Charlotte, who we all remember from the meetings. She can be reached as follows:

Charlotte Cobb  
650 Harrison Avenue  
Claremont, CA 91711  
(909)625-0858

Members will probably remember Walt for his continually pointing out that religion and science were not incompatible and should be working together for social betterment. His paper, "Science and Religion Together for a Livable World" was distributed to all members. Additional copies are available from the office.

One SCFS member commented that "we've lost a treasure house of human values". This rather succinctly sums up the sentiments of us all.

## Old Computer Donations Needed for Cuba INFOMED Project

Make a tax-deductible donation of old IBM-type Computers with hard discs in good working order. The deadline for this project is **January 24, 1996**. Please tell your friends and neighbors; they can call the office at **(310) 390-3898**. Pickup, packing, and transportation to Cuba is already arranged.

## Bring Back the Wizard Show

— by Bob Nelson

For fifteen years two SCFS members, Bob Nelson and Shel Plotkin, were the principals behind the Wizard Show on KPFK. Once a week, they interviewed a guest regarding a technical topic. They took care to see to it that the mystification that surrounds science in the popular media was cleared away. Each show stressed the fundamental scientific concepts that were at play. They stressed concepts such as the fundamental conservation laws, the thermodynamic relations, the laws of motion and gravitation. They paid particular attention to principles of designing the controlled experiment.

Often their programming contradicted the message that was being sent by other programming on KPFK as the station evolved from being the foundation of a rational critique of society in the 1960's and 70's and began to embrace the pseudoscience that permeates our culture today, such as witchcraft, free energy from the air, and astrology.

Ultimately the management of KPFK wanted to move their show to 8:00 a.m. on Sunday mornings, a time when it would be impossible to get live guests to put before the listeners. Bobby and Shel withdrew the show rather than attempt to cope with this impossible situation.

SCFS members responded with strong support. More than 100 letters were sent to the KPFK management, including letters from LA School Board member Julie Korenstein and Griffith Observatory Director, Ed Krupp. Both Korenstein and Krupp had been guests on the Wizard Show in the past.

The new KPFK station manager, Mark Schubb, has agreed to reassess the status of the Wizards when a new program director has been hired for the station. The next few weeks are very important. If you have not conveyed your views to the station, please do it now. Send letters to:

**Mark Schubb**  
**Manager KPFK**  
**3729 Cahuenga Boulevard West**  
**North Hollywood, CA 91604.**

## PILGRIMAGE TO TRINITY

— by James C. Warf  
July 1995

THE OCCASION. — July 16 of this year marked the 50th anniversary of the first nuclear explosion in human history. The site was opened to the public in 1953. The test explosion was named Trinity by Oppenheimer in 1944 after preparations for the implosion blast had been started. The territory, covered with mesquite and yucca, is at the north end of *La Jornada del Muerto* (The Trail of the Dead Man).

GETTING THERE. — On July 15 I flew to Albuquerque and drove to the town of Socorro. Lectures had been scheduled that Saturday evening at the New Mexico Institute of Mining and Technology. The first speaker was Dr. Robert Walker, who worked on the Manhattan Project in Fermi's chain reaction group in Chicago and Los Alamos, and after the war became professor of physics at Cal Tech. The other was Ferenc Szasz, historian of the early atomic era and author of *The Day the Sun Rose Twice*.

DAWN, 50 YEARS LATER. — By 4:30 in the morning Sunday I was waiting in a line of vehicles for the gate to open at 5:00. The traffic finally moved, and I walked into a circular fenced area whose center was ground zero. The bomb in 1945 began to explode 5:29:45 a.m. The point marking fifty years later to the second came and went; there was no sounding on a ram's horn, no announcement or ceremony, nothing except a moment of meditative silence. Maybe that was best. Dawn was clearly imminent.

A black obelisk about 15 feet high has been built on ground zero. One of the four ferroconcrete pedestals of the steel tower holding the bomb survives. About 20 soldiers had surrounded the monument. A few minutes later a band of hippy-esque characters arrived with drums and circled the obelisk while chanting. I never did learn what point they were trying to make. Later an event took place which I did not personally observe: someone rushed through the line of soldiers and threw a brown liquid on the obelisk. Symbolic blood, it was said. A woman held a string of 1000 origami paper cranes as

a representation of peace. During the morning, more than 5000 visitors attended.

A low shelter about 20 by 40 feet in size has been built over a portion of the crater floor to maintain it in an undisturbed condition. Windows in the slanting roof permit a view inside, and some of the fused, blue-green glassy globules (trinitite) can be seen. These were formed where the fireball touched the ground.

### TEST WITH CONVENTIONAL EXPLOSIVE.

— On May 7 a test was carried out in which 100 tons of TNT was exploded on a wooden trestle. This was about half a mile south of ground zero. The purpose was to practice routines and to try out instruments. Some radioactive material from Hanford had been put into the huge stack of explosive to give an idea of the distribution of radioactive material in the upcoming blast.

**THE BOMB.** — In those vapory days the physicists concluded that a test of the implosion principle was essential, and therefore constructed the first nuclear bomb for this purpose. It consisted of a duralumin shell about five feet in diameter, enclosing 5000 pounds of high explosive just inside, then a heavy uranium sphere (the tamper), and a plutonium sphere in the center.

The explosive was of two kinds. The outer layer was made of a type known as Composition B, consisting of TNT, RDX (an explosive more powerful than TNT), and wax. It was cast into the form of lenses (or shaped charges), and was fast acting. Below that was a layer of Baratol, a mixture of barium nitrate, aluminum powder, TNT, guncotton, and a binder; this one was relatively slow acting. Below this was more Composition B, encasing the uranium tamper. The two-ton tamper was in parts, and one could be removed to insert the plutonium. There were 32 detonators regularly spaced on the outside of the assembly. They led to wires embedded in the explosive. For detonation, a high-voltage capacitor discharged through the wires, vaporizing the metal simultaneously in all detonators and initiating the explosion.

The plutonium was 94 % of isotope 239 with

the remainder mainly isotope 240. The critical mass of this metal with a neutron reflector is 5 kilograms. It had been alloyed with a little gallium to make it malleable enough to be shaped by forging. It was in the shape of two hemispheres which together were about the size of a small orange, slightly subcritical. They had been plated with nickel to prevent corrosion; the flat surfaces were further protected by a layer of gold leaf. Each half-sphere had a hemispherical depression in the center to accommodate the neutron generator, consisting of polonium-210 and beryllium. They were kept separated by foils until detonation, when the implosion mixed them and caused generation of neutrons. This insured a vigorous start of the chain reaction.

A steel tower 100 feet tall had been built. It had a heavy oaken platform at the top to hold the bomb. Three half-buried concrete bunkers were constructed, each 5.7 miles from ground zero. These housed instrumentation, including high-speed cameras protected by thick bulletproof glass in port-holes. The northwest bunker can be seen near the access road to the site. Base camp was about 10 miles south.

On July 14 the bomb was hoisted up the tower through the open floor, and secured. The detonators were attached and the firing assembly readied. Every step was checked and rechecked through July 15.

**THE BLAST.** — A rain forced postponement of the test a few hours until 5:30 a.m. on July 16. Many visitors had assembled on Compañia Hill, 20 miles northwest of ground zero. These included Bethe, Teller, Feynman, Peierls, and Chadwick, discoverer of the neutron. At the base camp were Oppenheimer, Fermi, Groves, Rabi, Segrè, Kistiakowsky, Bainbridge, Morrison, and others.

The controls for the firing were in the south bunker. The arming party set it for 20 minutes at 5:09:45. Shallow depressions had been bulldozed at the base camp so the observers could lie down behind a protective mound. Tension among the scientists became almost unbearable.

The detonation started just before 5:30. The shock waves from the fast-acting Composition B lenses focused onto the Baratol underneath. The waves combined, detonating the second layer of Composition B. All shock waves hit the tamper

simultaneously, delivering a hammer blow of incredible energy. The plutonium inside was squeezed into perhaps one-third its original volume. If this is the case, the one critical mass became nine. This is because the neutrons have a shorter distance to travel to cause fission.

The x- and gamma rays liberated were absorbed by the surrounding air raising it to incandescence; this was the fireball. Its radius was much more than the 100 feet height of the tower, and hence touched and vaporized earth. The vaporized earth condensed along with fission products, forming fallout which fell to the northwest. The downward force compacted the dry earth and formed a shallow crater. On firing, the bomb produced an appalling burst of heat and light, as if from the very vortex of hell. This was the factor which impressed the awed observers most deeply. The only journalist present, William L. Lawrence, wrote "From the east came the first signs of dawn. And just at that moment, there arose as if from the bowels of the Earth a light not of this world, the light of many Suns in one." The echoes reverberated repeatedly from the mountains.

The army had lined two tanks with two-inch-thick lead and equipped them with scoops to collect samples. Physicists Fermi and Herbert Anderson entered the tanks, each with its driver; Fermi's tank broke down after a mile, and he had to walk back. Anderson was driven on to ground zero, and saw that the entire tower and its accessories had been vaporized. Only the stubs of the tower footings remained. He collected a scoop of the rubble, but had to leave at once because the gamma radiation was too intense in spite of the shielding. Radiochemical analysis for unfissioned plutonium and fission products revealed that the yield was 18.6 kilotons. The shock wave broke windows 120 miles away. Pandora's nuclear tinderbox had been opened.

A coded message on the success of the bomb was sent to President Truman in Potsdam, Germany, where he was meeting with Churchill and Stalin.

**RADIOACTIVITY MEASUREMENTS.** — Using a very sensitive Geiger counter I measured the level of radioactivity (gamma rays, mostly from cesium-137) at many points in the site. Downwind from ground zero as far as the fenced boundary the

radioactivity was clearly evident. It was around 1200 counts per minute, much less than at the corresponding Soviet site in Kazakhstan which I visited last year. The level at Trinity was about 50 or 60 times background level. In general, the visitors experienced much more danger from the pitiless sunshine than from the gamma rays from the ground.

A half dozen times I was approached by TV or print media journalists, who had seen me measuring the radioactivity levels. They questioned me at length about the results and their meaning, as well as my feelings, etc.

**OTHER OBSERVATIONS.** — Four hours after the Trinity test, a ship sailed under the Golden Gate bridge with its cargo of the uranium-235 gun-assembly bomb. It had the heavy cannon and projectile parts; the target rings were flown out later. That bomb leveled Hiroshima on August 6, 1945. The Nagasaki bomb was a twin of the Trinity bomb.

This account does not address the issues of whether the bomb should have been used against Japan, or whether at least alternatives should have been tried first.

Someday we Americans will look back on the long nuclear arms race much as we now look back on the Crusades, a futile, wasteful, dangerous activity driven by fanaticism.

###

---

## SCFS NOTES

**HIROSHIMA DAY, 1995** — To commemorate August 6, Nina Byers and James C. Warf representing SCFS gave joint lectures on Hiroshima and related events at the Midnight Special Bookstore in Santa Monica. More than 50 people attended.

**KAZAKHSTAN VISIT** — In the previous issue of the Forum, an account of the visit by James C. Warf to the old Soviet nuclear testing grounds in what was then the Kazakh Republic was described. A summary of this report was published in the Sept.-Oct. issue of the Bulletin of the Atomic Scientists.

###

# SCFS Task Group Reports

## Transportation

The decision was made to submit a grant proposal to study and determine a long-term transportation program for Southern California. Actually, much of the basic system has already been determined and is ready for elaboration. The previous completed studies go back many years. SCFS has always maintained a low key effort dealing with transportation issues.

The systems engineering approach used here means that the final configuration, perhaps fifty years hence, needs specifying at the outset. Once this future system is delineated, study activity proceeds along the line of determining the best course of action, based upon present circumstances, for getting from “here to there”.

At no point in the various studies of Southern California transportation has a final future system configuration ever been specified. Essentially, this aspect is what invalidates much of the elaborate studies already carried out by SCAG and others.

A very ambitious project is contemplated, but it is fraught with a multitude of political and economic pressures from special interest groups. Regarding this aspect the task group responds with a casual “so what else is new?”.

## Rocketdyne Clean-up Coalition, RCC

There were three initial goals when this community group was formed about five years ago:

- 1). Shut down all nuclear power work at the Santa Susana Field Laboratory, SSFL
- 2). Determine the health effects on Simi Valley-San Fernando Valley residents from the environmental contamination caused by Rockwell at the SSFL.
- 3). Make certain the SSFL land is cleaned up and restored to its original pristine condition.

Of these goals, only (1) has been achieved and work is proceeding on (2). An SCFS member was selected as one of the 4 community representatives for the RCC on an EPA SSFL Working Group and also the Advisory Panel for an epidemiological study of health effects on Rockwell workers. The latter is supposed to oversee the activities of an epidemiology team from UCLA that is performing the actual study of effects of Rockwell’s environmental contamination. While this study is supposed to include both chemical and radioactivity effects, Rockwell claims it has lost all the chemical exposure records before 1985. The community representatives on the Advisory Panel were voted down by the other panel members on a motion to call in the FBI to search for the missing data. Thus the study will essentially include only radioactive exposures and be limited to mortality.

The philosophy was that because it is almost impossible to assess possible health effects on residents from Rockwell’s negligence, a study of the workers would be more meaningful. Results of the study will not be available until sometime next year. The community representatives have a very critical problem deciding in the near future whether or not the study will likely have any validity at all. One option these reps have is to resign from the panel because they lack confidence in the epidemiology work being done. This has to be decided soon, so in the end the reps decisions will not look like “sour grapes”.

## Vietnam Wind Energy

This SCFS group only has two members, but they have been active for the past five years. Thus far wind data has been collected at a site, Can Gio, near Ho Chi Minh City using the monitoring equipment donated to SCFS by the American Friends Service Committee. Unfortunately, average wind velocity at Can Gio is only 5.3 m/s (12 mph) which is only economic for presently available wind turbines if the monetary loan for capital equipment is not only low interest but also long-term. The wind farms in California have similar wind velocities and long-term financing was obtained here. To the chagrin of the SCFS Vietnam Task Group, only short-term loans from the “money sharks” or venture capitalists seems to be available for

this project. Such people do not mind lending large amounts of money at low interest rates, but they demand near 100% assurance that their money will be repaid within a ten year period.

In order to meet this short payback period requirement, it is necessary that the average wind velocity be at least 7 m/s (16 mph). There is only one area in Vietnam that might possess wind of this velocity and efforts are now underway to obtain funding for a 30 m (100 ft) pole at that location. The monitoring equipment is already in Vietnam.

Unfortunately indications are that new electricity generating stations in Vietnam and SE Asia will be patterned after those in the developed countries. Needless to say, this would be a real disaster regarding our consumption of natural resources in that Vietnam and other developing countries will certainly be building up substantial power generating facilities. The only hope is that somehow our SCFS and other similar efforts will be successful, along with a significant shift in the already developed countries toward use of renewable energy sources.

### **Ward Valley Nuclear Waste Dump**

The battle to save Ward Valley has reached a critical stage. The National Academy of Sciences endorsed the site, despite two dissents to portions of the report. The study opened the way for the federal government to transfer the land. Prior to the report Secretary of Interior Babbitt had promised to conduct an evidentiary hearing to review issues outside the Academy's mandate as well as those it considered. However, following the release of the findings, the Secretary indicated that the Academy's work sufficed.

Soon after Babbitt's announcement negotiations between the Department of Interior and the California Department of Health Services ensued. The Federal government demanded the right to verify that the State did not exceed the amount of plutonium that the license allowed. The issue was one of several which contributed to an impasse. With the breakdown

of negotiations, site proponents went to Congress and attached land transfer provisions to a budget reconciliation act. All that stood in the way of opening of the site was a Presidential veto. However, Senator Boxer was able to remove Ward Valley from the Legislation that did pass, so the matter is now being held in abeyance.

### **AAAS Science Magazine and the Ward Valley Nuclear Waste Dump**

*Science*, the official journal of the American Association for the Advancement of Science, carried an extremely biased editorial by Philip Abelson in the June 16, 1995 issue contending that a Ward Valley dump would be a good thing. Criticism of that editorial was finally aired in the September 22, 1995 issue with five letters presenting a large variety of erroneous statements in the Abelson editorial.

Of these letters, the one from our own Jim Warf was the lead and set the tone for all the others. The major SCFS technical efforts toward analyzing the proposed Ward Valley nuclear waste dump have been performed by Jim Warf, so it was most appropriate for his letter to be accorded such prominence.

### **SCFS General Meeting 7/25/95**

Bernardo Toscana, Third Secretary Cuban Interests Section in Washington, DC, addressed us regarding the effects on Cuba of the economic collapse of Eastern Europe, the US embargo/blockade, and the 1993 "storm of the century". Cuba actually has suffered a "triple-whammy" in recent years, any one of which capable of being catastrophic. Rather abruptly Cuba lost 85% of its foreign trade and shortly thereafter suffered the worst hurricane on record. Estimated damage from this gigantic storm was \$1B (for a country of about 10M people). Needless to say, Cuban officials referring to 1993 as a "special period" in Cuban history is perhaps the understatement of the day.

Added to the two uncontrollable disasters is the

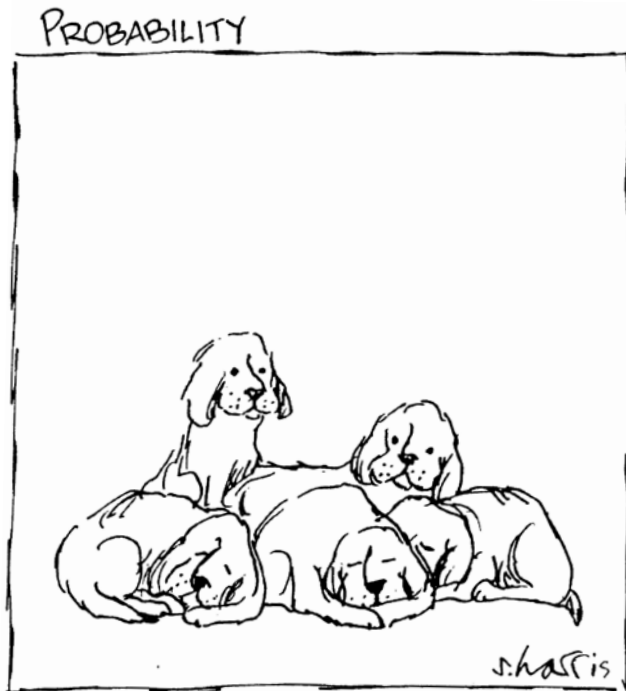
U.S. embargo/blockade which prevents any ship stopping in Cuba from also stopping in a U.S. port for a period of six months. This is clearly a violation of international law which makes the U.S. look rather hypocritical when we try to insist on enforcement of agreements with other countries and talk about our allegiance to the "rule of law".

However, even though Cuba has responded miraculously to its massive problems, this it does not detract from the criticism leveled by some SCFS members against Cuba's energy policies. Their nuclear power policy comes under particular vehement attack, as well as lack of development plans for use of renewable energy. SCFS members have tried to make contact with Cuban authorities in the past without success.

Mr. Toscano was given copies of SCFS papers on conversion of nuclear power plants and disposal of high-level nuclear waste and an outline listing renewable energy sources. Hopefully, these documents will find their way to Cuban energy policy makers. Additionally, a letter was sent to Mr. Toscano after the meeting volunteering one or two SCFS energy consultants to discuss energy matters with appropriate Cuban officials in Havana. As of this date no response has been received to that letter which was sent August 1, 1995.

###

[ Recently acquired information from our SCFS source in Havana is that Cuba does have a wind farm project with a German group. Details concerning that activity are not available. Neither are there any details concerning other reports about solar energy activity. ]



If Shel has 5 dogs, 3 will be asleep.



"There's a 60% chance of 20% acid-rain and a 40% chance of 30% acid-rain."

Please help the **Southern California Federation of Scientists** provide the scientific and technical knowledge that will enable the public and it's officials to better understand the issues affecting science, society and public policy.

**NAME** \_\_\_\_\_

**AFFILIATION** \_\_\_\_\_

**ADDRESS** \_\_\_\_\_

**CITY** \_\_\_\_\_

**Home Phone** \_\_\_\_\_ **Business Phone** \_\_\_\_\_

I would like to support the work of the SCFS:

\_\_\_\_\_ Regular Member, \$40 \_\_\_\_\_ Student or Retired, \$20.

\_\_\_\_\_ Enclosed is an extra gift of \$ \_\_\_\_\_.

I am interested in: \_\_\_\_\_

\_\_\_\_\_ Research \_\_\_\_\_ Task groups \_\_\_\_\_ Public Ed. \_\_\_\_\_ Office work.

My field of expertise is \_\_\_\_\_

Please mail your tax-deductible check to

**SCFS**

**3318 Colbert Ave., Suite #200**

**Los Angeles, CA. 90066**

**(310) 390-3898**

---

Southern California

Federation of Scientists

3318 Colbert Ave., Suite #200

Los Angeles, CA. 90066

ADDRESS CORRECTION REQUESTED