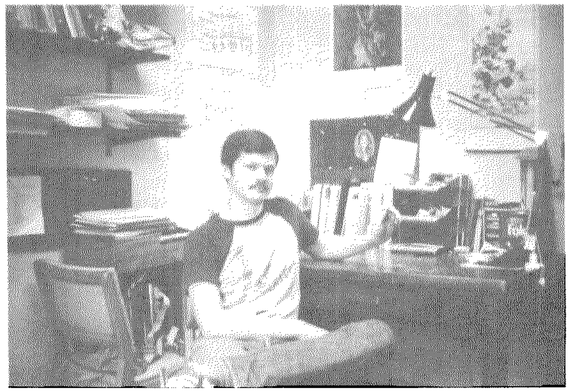
Ditch Day Stacks Up

One Senior's Account

by Robert Lang



Robert Lang presides over his Ricketts room in quieter times before Ditch Day.

Senior Ditch Day started as a Caltech tradition in 1921 when "the seniors of the Institute took it upon themselves to strew the sands of Ocean Park with their intellectual personalities," leaving classes and campus behind. Over the years the seniors began to keep the date of their planned ditching a secret, which of course challenged underclassmen to find it out and to disrupt the day in some way – relocating the seniors' possessions while they were gone or "redecorating" their rooms. By the 1950s the seniors were shoring up their doors and windows with imaginative protection plans, and these "stacks" have grown more and more elaborate in the last 20 years or so, some involving brute force to break down while others (finesse stacks) are of a more intellectual nature and require students to be on their honor to perform the tasks. Usually the underclassmen do manage to break in, whereupon they can accept an offered bribe of food and drink or decline the bribe and "counterstack." Recent counterstacks have involved making one senior's room into a swimming pool and reassembling another's room intact on the roof.

Robert Lang (BS '82 in electrical engineering and now a graduate student at Stanford) describes the stack for his room in Ricketts House.

SENIOR Ditch Day began officially at 8:00 a.m. on Friday, May 7. That is, all seniors were required to be off campus on pain of being roped to a tree for the duration of the day. Of course, Ditch Day had really been weeks in the making, albeit covertly. My stack (created in collaboration with fellow student Camilla Van Voorhees) was conceived over a year ago when I decided on the final pun that located the key to my room. I had placed a copy of my key in its hiding place in January. The general form of the stack came together over the course of third term, as we discussed what cruel and unusual tasks we could require of the eager little underclassmen.

The stack finally coalesced the week of Ditch Day. It consisted of a trail of clues, the solution to which required building climbing, steam tunneling, and a familiarity with such things as Shakespeare, chemistry, psychology, electrical engineering, the music of Keith Emerson, and the elvish alphabet from Tolkien. Eventually the design of the stack grew so complicated that we were forced to draft a flow diagram to keep track of the branches of the path and the various cross-links. Actually laying the trail of clues took the whole night before Ditch Day.

By 7:55 the underclassmen were up and around, waiting in gleeful anticipation of the stacks they were going to assault. At 7:59 I left (not for the beach but to go to sleep somewhere) and locked my room, leaving on my door the terms of the stack:

1) You may enter only with the key to this room, which is hidden somewhere on campus.

2) The whereabouts of the key is encoded in a sequence of 29 four-digit numbers. It is not necessary to have all 29 numbers to get the message.

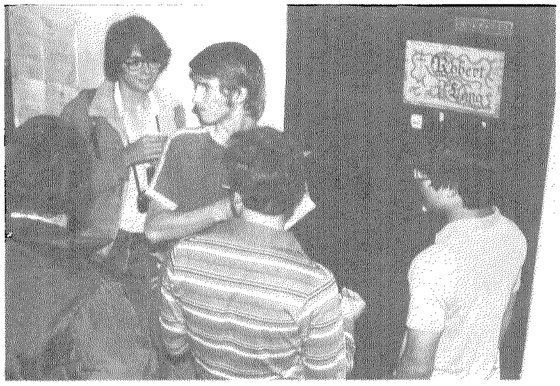
3) You must find the 29 numbers as well as crack the code. Timed clues will be provided, including an EE problem, which, when solved, will tell the secret to the encryption method.

4) More informaton will be made available to you as you work through the stack.

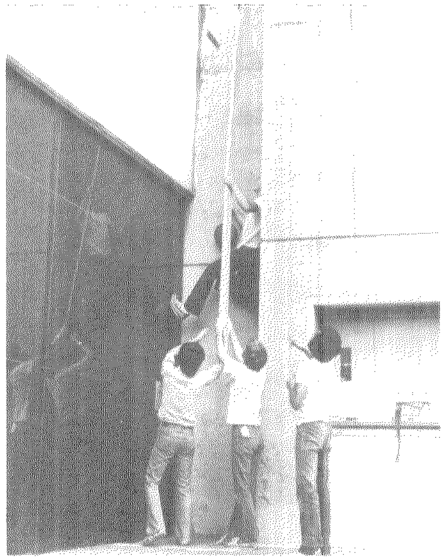
5) The first piece of information you need is located between pages 278 and 529 of *Radio Operating Questions and Answers*, a book located at window level on the second floor of Millikan Library, roughly 25 ft. south of the northernmost part of the building, and exactly 12 ft. west of the west side of the main card catalog.

To start off, the underclassmen would have to find the first piece of information as instructed in 5). If they followed the dimensions *exactly*, they would find that the book should be located about two feet beyond the interior wall of the building. Sure enough, the book was taped to the outside of the building, necessitating a climb to the second floor to retrieve it.

Inside the book was a note that split the trail into two portions. One led to an envelope in my mailbox that contained timed clues; the other portion continued in a climbing vein. Theoretically timed clues shouldn't be necessary, but they are frequently offered in case the stackbreakers get stumped. The extra hints were placed in sealed envelopes with the times they could be opened — every hour or so — on the outside.

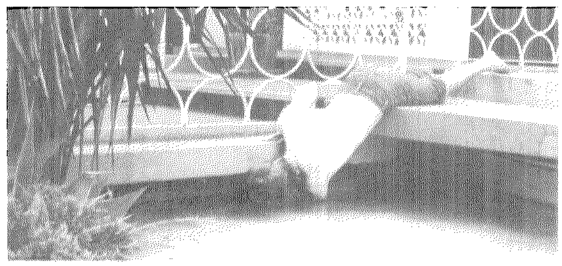


8:05 *outside the door*



9:10 *Millikan Library*

10:15 *Bridge Lab*



9:45 *apartment house moat*

Underclassmen begin their odyssey at Lang's door (top left) where the key is hidden right before their eyes. Directions in the book retrieved from a library ledge (top center) leads the stackbreakers on a merry climb after clues in a wide assortment of nearly inaccessible spots on campus (and off). Freshman Mark Hammond is the chief climber.

11:30 *Kerckhoff's dome*

2:10 *Athenaeum window ledge*

The second portion of the stack led off on a campus-building-climbing trail from Millikan Library to the wrought-iron lattice over the windows in the Athenaeum, to the concrete latticework on the back of Bridge Laboratory. From there, the trail led back to the Athenaeum (climb a tree), to Kerckhoff Lab (on top of the dome), to the North-South connector in the steam tunnels, to a balcony on the Athenaeum, a ledge outside the third floor of Crellin, and the top of the 20-foot-tall delivery doors to the Athenaeum. The trail continued to the second floor of the uncompleted Braun Lab, the metal latticework over the main entrance to Church Lab, the tiny room behind the concrete grill in the side of Gates, and finally to the overpass between Firestone and Guggenheim.

At each point in the climbing trail, the stackbreakers were directed to the next point and were given a set of clues or problems in an envelope. The solution of a particular problem provided one or more of the 29 four-digit numbers that encoded the location of the key. For example, this clue was located on the second floor of Braun:

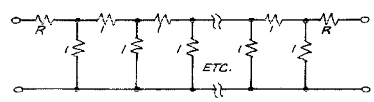
> "Because I could not stop for Death,
> He kindly stopped for me —
> The Carriage held but just Ourselves
> And Immortality."
>
> To find code number 7 of 29, square the value of the author's first name and then add 104.

The underclassmen would have to know (or find out) that the author is Emily Dickinson, whose first name (a = 1, b = 2, and so on) adds up to 64. That squared is 4096 plus 104 is 4200 — one, just one, four-digit number of the 29.

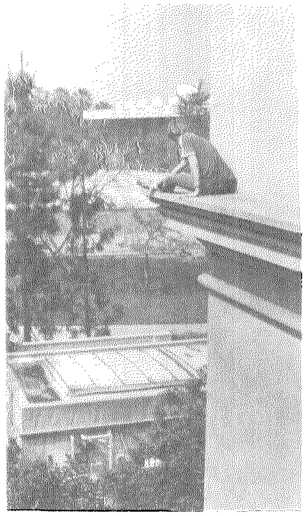
Access to some of the numbers also involved running and swimming laps, singing in the Athenaeum at lunchtime, and asking a questionable question of a staff member, whose identity was hidden in a series of clues.

The secret to the encryption method was itself encrypted in an electrical engineering problem:

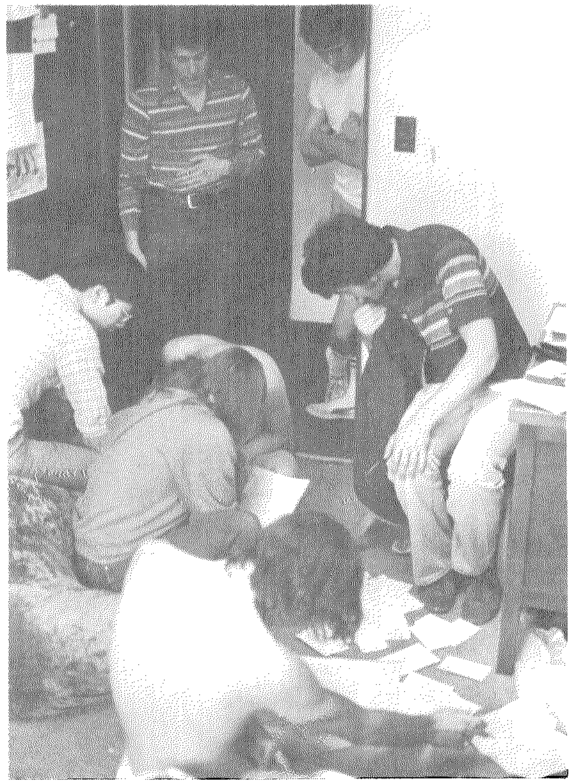
> Consider the resistor network shown below, consisting of 115 $1-\Omega$ resistors and two resistors of value $R-\Omega$ (where R is a positive integer).



3:00 *Public Relations*

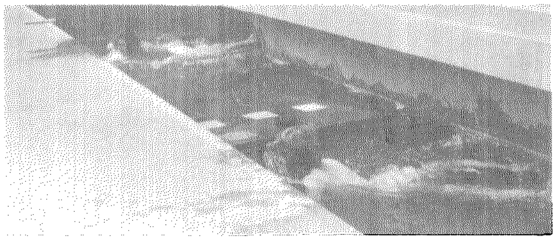


3:25 *Crellin – third floor*



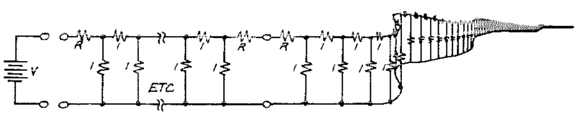
3:55 *next door*

Embarrassing questions, precarious perches, and swimming laps (very short ones) also yield clues. Meanwhile back in Ricketts, a growing crew assembles clues and tries to crack the code. Barry Lippey (bottom left) is the first to recognize the melody and retrieve the key.

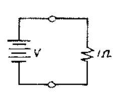


4:10 *Millikan pond*

We could string together an infinite number of these sections to form an infinite lattice, as shown below.



A battery of voltage V is connected across the two terminals of the lattice. You find that 1 Ampere of current flows. If the battery is subsequently connected in series with a $1-\Omega$ resistor (see below), an integral number of Watts of power is dissipated in the resistor.



If V is not an integral number of volts, what is the smallest possible value of R in Ω?

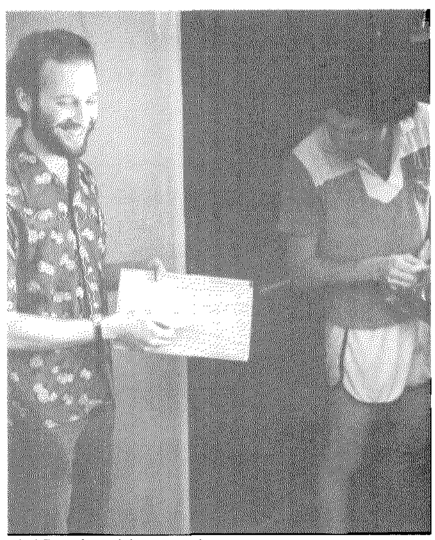
When the value of R was added to a 26-digit number and then separated into two-digit groups, substituting letters for the groups gave the answer "AUDIO FREQ." This answer might also have been arrived at without the solution to the EE problem by figuring out the mathematical relationships and patterns in the four-digit numbers. The 29 four-digit numbers were the frequencies of notes in a melody — "Auld Lang Syne." The key was hidden behind an old Lang sign — the nameplate on my door.

After a whole day's work by between three and a dozen underclassmen at various times produced 20 of the 29 numbers, and the EE problem was solved in many hours at the computer, the stack finally succumbed at 4:35, barely 25 minutes before the official end of Ditch Day. There was some discussion of counterstacking, but the allure of the bribe (ginger ale, cookies, fresh fruit, and a saucy but unpretentious rosé) proved too much after a tiring day, and the stackbreakers fell to with gusto.

Some of the clues are still waiting for some future climber to discover. If, for example, facing south you start at the lower left corner of the Firestone-Guggenheim overpass and count nine squares in and six squares up on the facade pattern, you can still see an envelope containing clue number 17. □

The solution to the EE problem is $\frac{1}{2}(f_{115}+1)$ where f_{115} is the 115th Fibonacci number. The value of R is 390,887,039,715,493,615,101,719.

4:30 *numbers become notes*



4:35 *the old Lang sign*