



tek talk

employees' publication of Tektronix, Inc.

volume 7, number 5

June 30, 1960



election year: teks meet a candidate

tek talk a way to give double

Published and printed by Tektronix, Inc., 13955 SW Millikan Way, Beaverton, Oregon, by and for its employees and with the cooperation of the Printing, Photography and Advertising Departments.

COMMUNICATIONS STAFF

Dale Torbert
secretary, departmental news
Tom Williams
supervisor, Coffee Break column
Ken Ireland
graphic designer

EDITOR

Joe Floren

COVER—On a fast-paced tour through the Beaverton plant May 19, Sen. John Kennedy, Democratic presidential hopeful, stopped to talk with Shipping employees Kitty Smith (next to him) and Jane Ross. At right is Leonard Woolhiser of Haney Trucking company. Microphone and camera crew accompanied the Massachusetts senator.

Following his brief tour, Senator Kennedy spoke to a large crowd of Tekes which overflowed the plant cafeteria.

He gave his views on the then-current U-2 spy plane incident, discussed other issues which will face the next president, and fielded several questions from the audience.

Below is a shot of the senator and his listeners.



a way to give double

"One of your employees has donated \$50 to us. Will you match it?" school official asks Tektronix Foundation.

Our answer, in most cases: Certainly.

The fact that some employees do give money to schools and colleges without letting the foundation know shows they may not be aware it will match their contribution.

This means some schools are losing out, foundation secretary Bill Webber and Treasurer Don Ellis point out.

The foundation, one of about 100 in the United States, is among the most liberal in its provisions: It will match any employee's gift, to any tax-exempt school, in any amount over \$10.

The offer applies if you contribute to a college—or if you give to a grade school. However, the donation must be an outright gift. It may not, for example, be tuition for a family member.

You need not have attended the school to which you give.

Each year, employee contributions have increased. So far this year, the foundation has matched the gifts of about 50 Tekes.

Philosophically, the foundation aims to broaden the base of support to education. Benefiting most are privately supported schools and colleges.

For the employee, it provides a painless way to double his contribution to the school he chooses.

If you mail your check directly to the school, you may lose the matching gift. Instead, please send it to Don Ellis, station 74-821, or Bill Webber, 74-870, and they'll handle the matter from there.

PRO and CON

Take a Look at CU

To the editor,

Here is a suggestion for all credit union members:

The next time that you are looking over the material on any of the bulletin boards, take a step closer and study the credit union's financial statement. You will find a current statement each month on each of Tek's 35 or 40 bulletin boards.

Look at the small dollar amount of delinquent loans as compared to the total loans. Check the infinitesimal amount of charge offs as compared to the over five millions of dollars loaned. Check the percentage of expenses as compared to total income.

All of these things add up to a better than average operation of a very substantial credit union.

A credit union, as any savings and loan business, is only as successful as its ability to loan its depositors money safely and to its fullest extent.

We are operating efficiently, have an excellent record for keeping delinquent loans to a minimum and have a very small percentage of charged-off accounts; therefore, we will pay to our shareholders a good year-end dividend plus an interest refund to our borrowers.

If you, the shareholders, wish to make more money available for loans, you should contact the credit union regarding additional payroll deductions to your savings account and then arrange to leave this money undisturbed.

By this we mean there is no advantage to you or to the borrowers if this money is deposited one month and withdrawn the next.

Dick Manning,
Manager

Blood Donors Come Through

To the editor,

Tektronix employees came through again. The bloodmobile truck made a special trip back to the blood center at noon June 10 because they were so low on blood.

The totals;

321 pints donated.

49 donors rejected for health reasons.

The total for the year so far is 663 pints, and the total since January 7, 1955 is 2827 pints.

Thanks again,

Don Pratt (Production Planning)
Blood Chairman

Tektronix Receives OMSI Award For Aid to Science Education



DICK RHIGER (Engineering) holds Oregon Museum of Science and Industry trophy awarded to Tektronix for its support to OMSI over the past few years. It is the first such presentation ever made by the museum.

An engraved trophy for "an outstanding contribution to the cause of science education" was presented to Tektronix by Oregon Museum of Science and Industry at the annual OMSI award dinner, held in Portland State college cafeteria May 28.

Museum president Don Newhouse bestowed the award and Dick Rhiger (Engineering) accepted on behalf of the company. He is a member of OMSI board of trustees.

It was the first such trophy ever presented by the science museum. A similar award, for an outstanding individual contribution, went to Jay Stevens, Portland civil engineer.

Specifically, the trophy honors Tek for our financial participation in the museum, contributions of material, volunteer work by individual employees, sponsorship of an electronics booth and maintenance of the museum's "plastic lady" exhibit.

IRE Awards Given

Lang Hedrick (Engineering), representing the local Institute of Radio Engineers, presented IRE awards at the dinner to the three Oregon high school students who submitted the top electronics and physics exhibits in the recent state science fair competition.

Dick presented OMSI awards to winners in the science fair intermediate division (seventh through 10th grades).

Maury Merrick (Mechanical Engineering) is also an OMSI board member but was not present.

Junior Achiever Advisors Named

Wayne DeVaul (Engineering), Walt Schmitt (CRT) and Orvin Olson (CRT) will be advisors for a Tektronix-sponsored junior achievement company next September. Alternates will be Jack Schaller (CRT) and Dick McMillian Sr. (Marketing Planning). All are volunteers.

Wayne will be business advisor, Walt production advisor and Orvin sales advisor.

For several years Tek has been among the Portland firms sponsoring the junior achievement program, which gives groups of high schoolers supervised experience in developing, producing and marketing a product.

Area Group Reps Name Chairmen

Following the reorganizing of our group representatives into three areas, these chairmen were elected:

Millikan Way area—Ken Stuart (Cust. Svc. Repair), chairman; Rose Avery (Field Training), alternate chairman.

Sunset area—Hap Flynn (CRT Tooling), chairman; Al Stewart, (Mech. Design), alternate chairman.

Beaverton area—Burt Batchelder (Assem. Spec. Stock), chairman; Ed McDonnell (Shop), alternate chairman.

Each area meets separately the same day—alternate Tuesdays—and the minutes of all three meetings are later coordinated by the panel of chairmen and alternates, headed by Bob Hart (Final).

Formerly group representatives from all areas met together every other Tuesday.

Paul Watts's Paper Wins Third Place

Paul Watts (Engineering Instrument Design) won third place in student papers competition at the seventh annual regional Institute of Radio Engineers convention in Seattle in May.

His paper was "Transient Effects in pn Junctions."

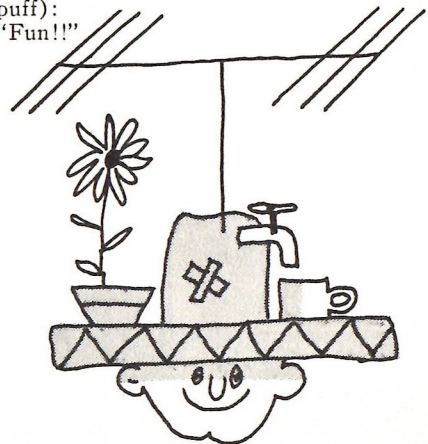
Paul graduated in June from Brigham Young university, Provo, Utah, where he majored in electrical engineering.

At Picnic: Mr. Tek, Miss Tek

"Who is Mr. Tek 1960? Who is Miss Tek 1960?" asks Don Pratt (Production Planning), acting as if he doesn't know.

"Find them at the annual picnic July 30 at Viking park," he invites, and adds:

"Start making a crazy hat for the crazy hat contest open to men, women and children. Contests, games, door prizes, Bingo, soda pop, ice cream, sno-cones, cotton candy, coffee, swimming, dancing, rides, ponies, entertainment and (puff, puff):
"Fun!!!"



tek research: IDEAS in the WIND

How long will Tektronix be making oscilloscopes? What will be our product tomorrow? Oscilloscopes are now the eyes and ears of engineers, scientists and maintenance men in their everyday work. Undoubtedly more sensitive, more accurate and faster methods of displaying information will be discovered.

Tektronix wants to be the first to provide new and better instruments made according to new principles. Our Research effort wants to make sure no progress in this direction is overlooked, as well as to contribute improvements to our present product.

There are many aspects to the Research function—to discover new ideas and techniques, to invent new components, to take advantage of newly discovered materials, to name a few. Our people in Research are no different from our people in Production or Engineering. They are there because they have proven their competence, ability and talents to do a job that Tek needs.

Although Research is glamorized in the newspapers, their work is a methodical and painstaking one, where new things are learned one by one in a continuous and organized effort—just like an oscilloscope is built. From their work we expect to get the basic components of our future "super-oscilloscope".

—Jean DeLord
Director of Research

A little disc about the size of a sand grain is cut out of a thin silicon wafer—and it becomes a four-layer switch that will do the job of an entire vacuum-tube circuit....

Voltage is applied across an experimental CRT face plate—and suddenly the phosphor becomes many times brighter....

From the tip of a whisker of diamond, a tip so small the eye can't see it, electrons are fired into a CRT—creating a current density 10 million times that of a CRT cathode....

Magic? In a way. Research.

"We try to catch scientific developments in the wind—before they've percolated down through the industry.

"We hope to get new ideas first, maybe two or three years in advance."

And Jean DeLord, head of our Research division, pauses and post scripts:

"And not all the bright people are at Tektronix."

Thus he spells out the goal, and the problem, of Research. How well it solves that problem—how to get there first with the best—will have a lot to do with whether Tek loses, keeps or lengthens its lead in oscillography.

Just as production people can't produce until Engineering has come up with a prototype, so engineers are limited in what they can design by the basic research done in solid state and vacuum devices.

JEAN DELORD, director of research, uses his blackboard to work out a knotty problem.



Our physicists call their work applied research, and they accent the second word. It's "applied" research because it aims to come up with devices specifically for Tektronix. The researchers' job: To fit their findings to Engineering's needs.

Current Research projects, if they pan out, may result in:

Faster triggering. Faster switching. Simpler circuits.

A CRT that's more sensitive, has a smaller spot and thus a faster writing rate.

Higher frequency instruments—that will measure smaller and smaller bits of time.

Headed in All Directions

Looking for these devices, researchers snoop about into many areas:

Into phosphors, for one. Jim Donoghue is working to develop a light amplifier to boost the brightness of our CRT.

Into "fast" diodes, for another, to improve our triggering.

Into new semiconductor components, tailored for specific functions. Into cold electron emission, to speed up our instruments' writing rates. Into beam injection, to combine the qualities of vacuum tubes and solid-state devices.

The division used to be called Semiconductors because of lot of its work deals with such materials. A semiconductor is neither a conductor nor an insulator, but a useful sort of material in which you can control the conductivity, making it behave either with positive or negative charges. In a semiconductor you can govern the density of the current carriers (the electrons, or the "holes").

Research, particularly in solid-state devices like transistors, is mushrooming nationwide. Many electronics industries like these versatile doodads because they're small and use little power. Tek's interest is more basic: In our instruments, certain jobs must be done that only solid-state devices can do.

Tunnel Diode Constructed

For example, to fill our need for a stable voltage-controlled negative resistance de-

vice which could trigger on very low-level signals, Research developed our Esaki "tunnel" diode.

"The gallium arsenide Esaki diode is a real hot project right now," Jean comments. The knowledge Tek physicists gained from their work on germanium diodes—and before that on silicon diodes—is now being applied to the gallium arsenide device.

Gallium arsenide is a crystalline compound of gallium and arsenic, and acts like neither one. Diodes of this material, because of their faster switchover and increased voltage swing, are superior to germanium devices and look good for triggering.

Tektronix was second to nobody in developing germanium diodes, and Research made several batches for our engineers to experiment with. As gallium arsenide diodes are produced, many germanium ones will go by the boards.

Intermetallics Versatile

Other applications for new intermetallic compounds include a high-speed switching diode to use, for example, in a sampling unit; a point emitter to increase the current density in a CRT beam, and a four-layer switching device which, among other things, will replace many of the Schmidt triggers (two vacuum tubes and some other components) we now use.

In charge of solid-state research is Bill Myers. He seeks to obtain materials with given properties—as to crystalline structure and impurity concentration—and to develop devices that will operate in a specific manner.

Paul Parks, as head of Device Development, is concerned with reproducing workable devices, procuring materials and, as he says, "packaging" the devices to protect them and fit each to a particular instrument.

Let's take a typical device, the tiny $pn\pi n$ switch (see photograph), still in the trial-and-error process of development.

1. From a 100-gram crystal of boron-doped silicon (about 6 inches long, $\frac{3}{4}$ inch in diameter and worth \$2 a gram), technicians saw off .010-inch wafers. In the process about half the raw crystal is chowdered up by the saw blade.

2. They lap (grind with abrasive) and chemically polish the slice to the size wanted.

3. They introduce impurities to controlled depths, forming junctions between parts of the crystal, to get the desired electrical characteristics.

The $pn\pi n$ switch has four layers and three leads. Into the boron-silicon wafer phosphorus is diffused, then aluminum is alloyed to one surface. This produces an aluminum (positive)-phosphorus (negative)-boron (P)-phosphorus (N) device that switches fast and is more stable than a vacuum tube.

4. They cut the wafer into tiny discs, apply cleaning chemicals, plate the disc with nickel and solder it so leads can be attached. "However, there are no cookbook procedures," Paul cautions.

The switch (actually two transistors dovetailed), which will be produced experimentally by summer's end, is a good example of what Jean calls "integrated electronics"—building function-performing devices, each made to do one certain complete job.

Bill Myers explains this concept further: A function-performing device is one which may do the job of an entire circuit although it doesn't resemble that circuit in the least. For example, the speck-sized $pn\pi n$ switch will replace some of our Schmidt trigger circuits.

Another 'Hot' Project

Another "hot" project is cold electron emission, emitting electrons from a solid into a vacuum—in this case into a CRT to obtain a faster writing rate.

Writing rate measures how fast a spot can travel across the scope screen and still be seen (or photographed). The faster the rate, the smaller interval of time the scope can measure.

Put it another way:

"Take a fountain pen with a given rate of ink flow," Bill Myers explains. "If it moves too fast across the paper, it doesn't leave a line you can see. It's the same with the electron beam and writing rate."

Ken Davis, consultant in phosphor research, describes writing rate still another way:

"In high frequency instruments we need a small spot because we're interested in details of voltage phenomena—wiggles, you might say. You can draw a line, for example, either with a fine pen or a wide brush, but if you use the brush you need a barn wall to write on."

The more light, the smaller the spot can be. The smaller the spot, the finer the line. The finer the line, the more precise the measurement, and the more useful the instrument.

Several Means to an End

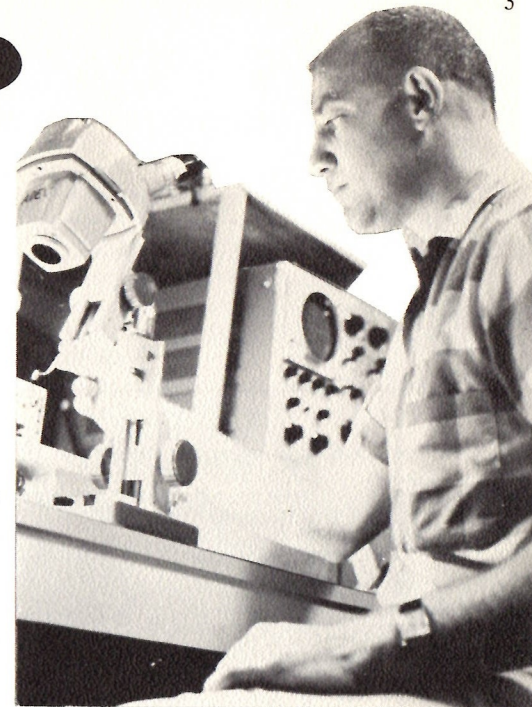
There are several ways to make a scope write faster. You can increase beam energy by accelerating the voltage more (up to 24 kilovolts in our fastest instrument, the 517). You can use a faster film when photographing the display. You can increase current density in the CRT beam. You can boost the phosphor's response to the electrons.

Unfortunately, voltage acceleration can be pushed only so far. As it increases, the beam becomes "stiffer" and less sensitive. The less its sensitivity, the stronger the signal needed to control it. And if you keep boosting the signal, pretty soon you run into amplifier trouble.

These solutions are left: (1) Faster film; (2) Increasing current density; (3) Souping up the phosphor. Tek Research is plugging away at (2) and (3).

Current research, including some in progress at Linfield college using tungsten, shows that "fantastic" current density can be obtained by drawing electrons off the point of tiny sliver-like devices.

Our CRT's sensitivity, speed and spot diameter are limited by its cathode. Whereas in thermal emission, electrons are "pushed" out by heating the cathode and boil off into the tube, field emission



PAUL PARKS is in charge of Device Development.

works differentially. By creating an intense field around the tip of the point emitter you "pull" the electrons out, and the resulting density is about 10,000,000 times that obtained with a hot cathode.

Trying Several Materials

We're experimenting with materials—both metals and semiconductors, formed to a point visible only through an electron microscope—to find one that has a high electric field and high current density, that will work well and that won't fall apart.

Another way to improve the writing rate is to amplify the CRT phosphor's response to electron bombardment.

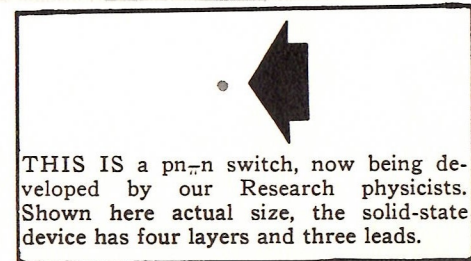
Our CRT face plate consists of glass, a phosphor (powdered zinc sulphide and a layer of aluminum. Jim Donoghue is working to develop instead an evaporated phosphor layer.

By sandwiching this layer between a transparent conducting layer of tin oxide and one of aluminum and applying voltage across the face plate, the beam's brightness is boosted a hundredfold. At least, so another lab has reported. However, there's a lot to be learned about phosphors.

Response to electron bombardment by the powdered phosphor layer in our present CRT is called cathodoluminescence. The phenomenon with which Jim is working—response of a voltage-activated evaporated phosphor layer to electrons—goes by the name of electroluminescence ("Wish there were a shorter word for it," he apologizes.)

And so the research projects go on, step by step—often routine, often glamorous, often frustrating. Some long-term, some short-term; some near completion, others just begun; some which will be worthless to Tek, others which may be major breakthroughs.

Never can tell what you'll come up with when you catch a new idea in the wind.



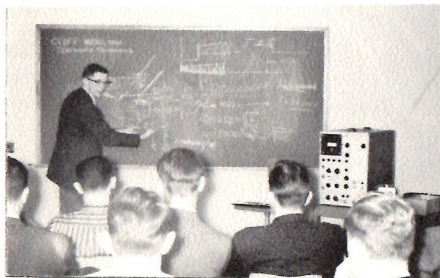
THIS IS a $pn\pi n$ switch, now being developed by our Research physicists. Shown here actual size, the solid-state device has four layers and three leads.



THIS IS HOW our Assembly 300 building, located west of the Beaverton plant, looked in mid-June. The structure and its sister building, Assembly 400, will be ready for occupation by fall.

coffee break

... WITH TOM WILLIAMS



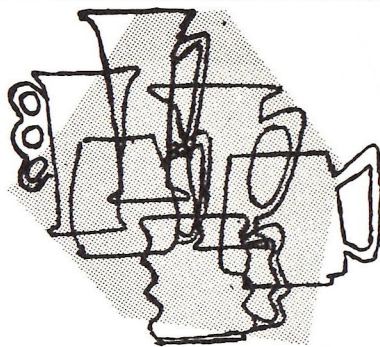
STRAWS IN THE WIND

Teks constantly remind publicists that circulars on windshields and advertisements stuffed through car windows are poor ways to get employee interest.

The use of such a broadside on the Sunset parking lot by Wayne Morse supporters couldn't have chosen a poorer approach. However, the fact that he actually lost the election the next day was only coincidental.

SUMMIT CONFERENCE

Don Clifford on a field stop at Boulder, Colorado Radio Propagation Lab talked to a man named Max via two way telephone/ham radio hookup. Max, somewhere high in the Andes mountains is having trouble with a 535A. Communication was most interesting since Max speaks Spanish more fluently than English. Mr. Miller of the lab in Boulder acted as interpreter as Don discussed CRT and circuit problems.



Cliff Moulton addressed two groups of customers at the Chicago office recently, telling them of the Type 519. All Chicago Field Office personnel sat in on the first session along with high-level technical people from Northwestern University, Armour Research, Argonne Laboratories and the University of Illinois. Photo at right shows Cliff in the midst of them with the Type 519 watching the Cliff watchers.

Another teaching activity, an operator course for 26 men (Not the Arizona Rangers) was conducted very ably by Bob Seaberg, Chicago. This was part of a four month course for Martin Co. people who work with the Missile-Master (MIKE) system. Tek films: Delaying Sweeps and CRT were shown and publications: Primer and "How to use your 535/545" were distributed at the end of the full day's session.

Teks Presented Service Awards

Fifty Tektronix employees have been given awards designating over 10 years' service.

Recipients had their choice of tie bar, bracelet or label button.

First to accept their awards were Howard Vollum, Jack Murdock, Bob Davis, Dal Dallas and Dick Ropiequet.

The following week, 10-year emblems were distributed to these Tekes:

Bob Poulin and George Scott, Militarized Products; Gordon Sloat and Barney Gregory, Transformers; Pius Scherr and Jack Henderson, Technical Services; Ken Walling, Printing.

Virginia Levens, John Larson, Dick Rhiger, Don Calnon, Frank Hood, Ray Greco, Henry Haase and Deane Kidd, Engineering; Archie Yergen and Ivan Arnold, Mechanical Engineering; Chuck Nolan, Engineering Special Products.

Bill Lee, Stock; Bob Fitzgerald, Finance; Howard Gault, Facilities; Bob Herren, plant engineer; Jack Day, Administration; Catherine Probstfield, Final.

John Taylor and Wendell Ferland, Assembly; Charles Jay, Preproduction; James Kelly, Turret Attenuators; Verna Dobson, Coils; Cy Woodworth, Test.

Leslie Purcell, Production Tooling; Genevieve Brink, Plastics; Helen Ross and Doris Kelly, Ceramics; Leroy Pen-son, Robert Strutz and Roger Carter, Shop.

Ed Stowe, Virgil Hall and Albert Briggs, Production Engineering.

Sandy Sanford, Field Engineer, Portland; Francis Frost, West Los Angeles; Paul Belles, Shipping; Dick Schmidt, Advertising; Rose Avery, Field Training.

Credit Union Adopts Flat Interest Rate

Tektronix Federal Credit Union has adopted an interest rate of 1 per cent on the unpaid balance, for all loans other than FHA Title 1 loans, according to Manager Dick Manning.

The Credit Union is affected by factors which have caused interest rates nationwide to increase, he points out.

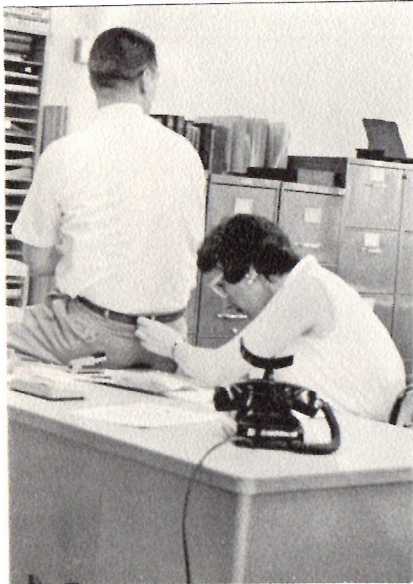
Using a flat rate instead of the previous $\frac{3}{4}$ to 1 per cent range will simplify bookkeeping and thus cut expenses, Dick adds.

When the year ends the CU will give an interest refund to all its borrowers, which refund will in effect reduce the interest they've paid on their loans.

The more efficient the CU operation, the larger the refund, Dick emphasizes. However, in no case will the refund decrease the dividend which the CU regularly pays its members who have savings accounts.

SERVICE TO employees—that's the motto of our Personnel department.

Today's roving camera peeps in on Marge Hazen, busy at one of the little personnel chores that make up a busy and interesting day.



Inside the britches she's repairing is Bill Bessey (Training), who afterward praised the job as workmanlike and in the best Tek tradition.

If you want to take advantage of our mending service, please do so on your coffee break.

ONE TEK reports this morning conversation with his little gal:
"Daddy, let me use your comb."
"Why not use your own comb?"
"Can't find it. Can I borrow yours?"
"Do you have to have it right now?"
"Yes."
"Well, okay...But give it right back."
"Thank you, Daddy...HERE, KITTY, KITTY...."



EKS

DO YOU have any unused stories about **your** kids? Stories you're dying to tell except that folks walk off every time you start talking?

Let Tek Talk solve your problem. Send in your best true little kid stories to Little Kid Stories, c/o Tek Talk, along with the top of an old can of rubber cement. If the story is real good, you may see it in print.

THIS IS A frog. It is a big frog. It is a fat frog. Furthermore, it is a Tek frog, and it lives alone in a puddle due north by northwest from the IO administration offices.



What it does, according to Tek bullfrog watchers, is just squat there day in, day out. It apparently has no social life.
"He's hibernating," is the analysis offered by Otto Zach (Facilities), who may, or not, know something

about it. That's Otto holding up Froggy.

If it **is** committing hibernation—and if it **is** a he—you'd think he'd be snoozing in a hollow log.

Once you think about it, June seems an odd sort of time to hibernate—and our front yard a strange place for it.

Hope some frog expert lets us in on what the critter's up to.

ALL IN a day's work for his crew of manuals strippers, says Ed Egan (Photography), was this recent penciled note of instructions:

"The 2 columns of text on page 5-3 will be placed at the beginning of page 4-2, so some of the text on 4-2 will run over to 4-3, which means that 2 columns of copy will fall onto a new page, 4-4. Now page 5-3 will be no more...Figs. 4-1 to 4-7 will have to be restripped. Start the Delta standard section on the same page that was page 5-3, which will become 6-1. The schematic on page 5-4 will become 6-2, so now the 1/3 page 6-2 will become 6-3.

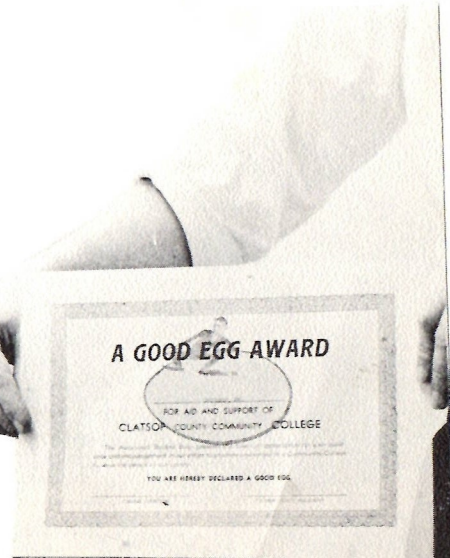
"Page 5-1 has had corrections, so restrip it..."

ONE OF the more sprightly citations Tektronix has received comes from Clatsop County Community college, and is called a Good Egg award.

It thanks Tek for some help we gave the school, and then proclaims in big black type:

"YOU ARE HEREBY DECLARED A GOOD EGG."

There's lots worse things a company could be called.



Murphy Seascope Tops Portland Amateur Show

A stereo set, first prize in an amateur painting contest sponsored in Portland by Motorola, went to Chet Murphy (Customer Service.)

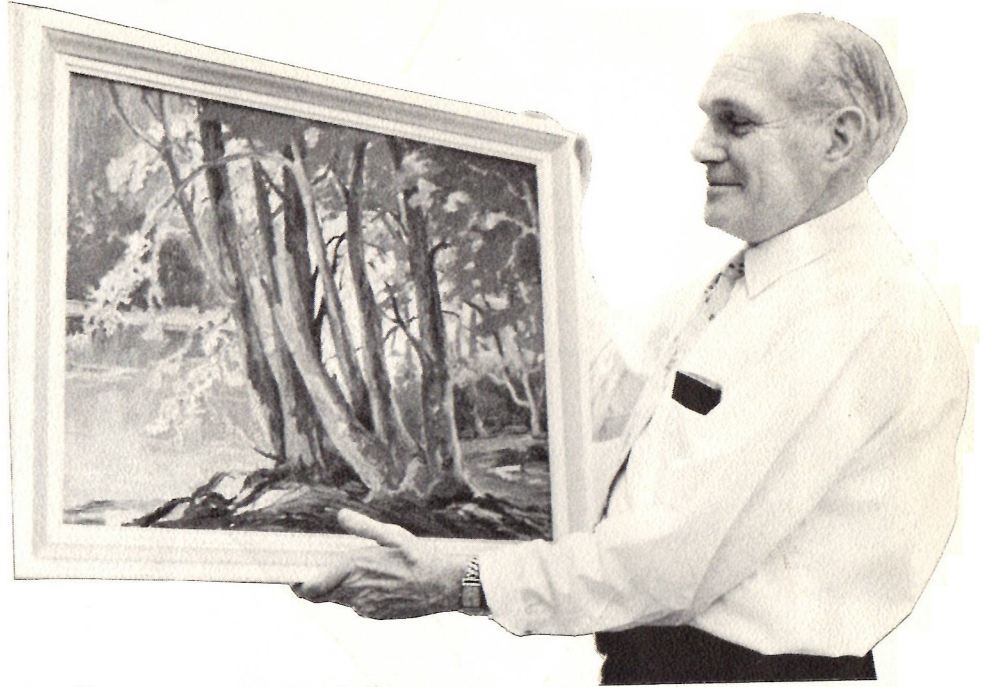
The exhibit, held earlier this spring at Smith's Home Furnishings, drew over 200 entries.

Chet, Tektronix's best-known painter, took top honors with a night seascape he calls "Nocturne."

The painting is now in Chicago for the national finals in the Motorola competition. Judging will be done sometime this month.

Others of Chet's works will be on display this summer at Maryhill museum, Washington, as part of a four-man show. He also plans a one-man show at Longview.

TYPICAL CHESTER MURPHY landscape is shown by the artist, as he prepares for exhibits in Longview and Maryhill, Wash. Now being judged in Chicago is a seascape with which he won first place in a recent Portland amateur show.



Tektronix, Inc.
P. O. Box 831
Portland 7, Oregon

Kermit Fleck
156 Malden Rd.
Matlydale
Syracuse 11, N. Y.

Tektronix Shows Instruments During Oregon Products Week

Tektronix participated in the annual Oregon products week, sponsored in mid-May by Portland retail trade bureau.

Three of our instruments—a 536 showing a roulette pattern, a 555 displaying satellite signals from a tape loop, and a revolving third instrument with its sides off to show the wiring and interior construction—were on exhibit in a Fifth

avenue window of Meier & Frank company throughout the week.

Backing up the Tek display were a colored panel and a large world map showing locations of our field offices and overseas distributors.

Aim of the annual event is to focus attention on agricultural and manufactured products of this state.

TEKTRONIX DISPLAY in Meier & Frank company window during Oregon Products week May 16-21 caught the fancy of passers-by. Here, pedestrians pause to watch the signals on two of our scopes.



BULK RATE
U. S. POSTAGE
PAID
Beverton, Oregon
Permit No. 1