tek talk

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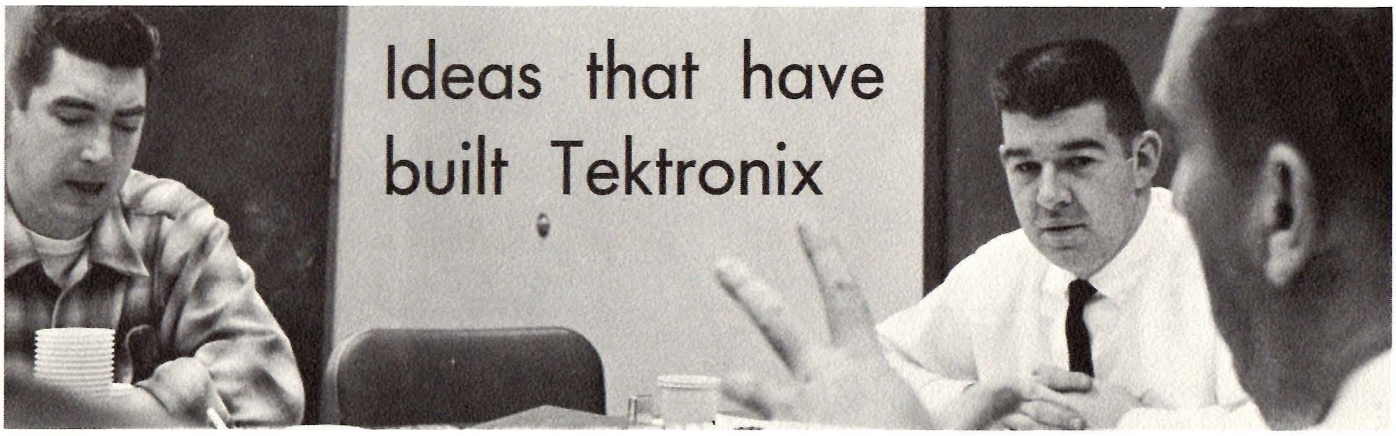
Quiet as the snow that mutes our valley, one year has blended into the next. There is immediacy about snow, but also nostalgia, something good-old-daysish; people grow contemplative. . . .

As weather shifts, so times change; the world takes on a new format, and a company grows to fit it. The year just run out was one of change for Tektronix—as all years of growth have been, and will be.

The year breaks: It is the traditional time for resolution, and for a clean look at where we are in time and space. It may be there is no more reasonable promise to exact from oneself than this: To look squarely, even eagerly, at change—a phenomenon which goes on, like the weather, but which, unlike weather, can be guided by wisdom and resolution into directions that are rewarding and right. . . .



COMMENT BY Derrol Pennington, CRT, gets close attention of Manufacturing Manager Mike Park (second from right) and Ken Spooner, Instrument Manufacturing, during regular Thursday meeting.

No. 5: MIKE PARK

(Believing that Tektronix owes its stature not only to its research, productive and engineering skills but also to the unique and vigorous personalities of its leaders, Tek Talk has undertaken a search to learn just what some of these people believe.
This is the fifth in a series of interviews. Mike Park is new Manufacturing manager.)

What's your history at Tektronix?

I was hired in November 1950 by Gordon Sloat, and started out stacking transformers. I was 19 and had gone to Central Catholic high school and service school at Camp Gordon, Ga. There were about 15 in the department.

Then I went to work for Ed Bauder in Test as repairman, which was sort of an entry job, working on 511s and 514s. Repairmen did the QC work, such as it was.

I was in Plugins for years, then I worked for Frank Kopra when we organized the first Test QC function. He was in charge of instruments and I of plugins.

From there I went in 1959 to Production Planning, a new group formed by Earl Scott and Bob Fitzgerald (by then Earl was in charge of Manufacturing.) We did the forecasting, everything; we were the only planning in the company.

In 1960 I was made Instrument Manufacturing production manager. About a year ago I became Instrument Manufacturing manager. And now this. . .

How does your new job differ from the position of Manufacturing Director which Bob Davis once had?

I don't know enough about his job to compare.

But the manufacturing job is different now: The product line has grown greatly in the last five years; there was no IMSE in 1958, except that which was inherent in Test; there was no formal QC function—again, excepting what was inherent in Test. . .

How does the increased size of the manufacturing organization affect the way you must operate?

I can't actually **operate** to the extent that Bob Davis could back in 1958. The depth and breadth of the present organization means that no one man can know all the details. There's no question about it—that's how staff develops.

What criteria do you have for establishment or expansion of staff functions?

That's a real tough one. I don't know how to put it into words, exactly. . .

Here's what I've got to do: State **what** my operating people's responsibilities are. When we get into special subjects which I'm unable to spell out personally—say to tell Ken Spooner what the specs are on the 540B—I use a staff function, as one of my arms.

And you build staff to represent you in organizations of peers, in these special functions.

Many services you couldn't **afford** to have all over the place—standards labs are a good example—nor could you have engineering talent everywhere. So a service forms that the individual organization can't afford and that meets a common need.

How does staff "overweight" develop in some areas?

Sometimes the real needs (what has to be accomplished) aren't spelled out clearly, and so staff is allowed to continue growing.

Also, some managers seem to feel the need to control and check on their subordinates. So they build staff "controlling" mechanisms.

Does the kind of staff organization a manager forms depend on his own strengths and weaknesses?

Yes. If I were a competent engineer or personnel man, for example, I'd have a different kind of staff activity, bolstering others of my limitations and lacks.

Do you share a belief in the extreme competence of Tek people?

I sure do. We're more than blessed with our fair share of skills.

Why is this?

A great part of it is because we **started** this way; we were very selective. And as a company, we have a strong basic approach toward "growing people" . . .

I agree that we haven't had time to grow as **many** as we want, but we do put great amounts of energy into personal development. If we hadn't, we wouldn't have made it.

In the absence of formal training programs, how has this "people-growing" process gone on?

There has been little formal training, right, but a tremendous amount of manager-to-subordinate coaching. This has been a way of life here for years.

Any manager is largely a teacher.

Is what's called the "Tek philosophy" responsible for any of this attitude?

This "awareness-of-people" aspect is basically a good thing, although certainly it's overworked sometimes: mistakes have been made in the name of fairness and charity. Sometimes this has indicated a lack of headsup management, sometimes fear of making a decision, sometimes a desire to take the easy way out.

But if this is the price, it's well worth it—if that philosophy has caused us to be extremely just in our dealings with each other, as I think it has.

It's easy to be kind. **I** do it. But justice means a kick in the fanny as much as it does a pat on the back.

A manager needs courage to criticize a guy who's tried but who's less than adequate. But this criticism is good for the company—and for that individual, too.

It's especially hard to criticize the guy who's up to his limit, and tell him you're not satisfied. The easy way out is to give him a better job, or continued wage increases—but you can't do this and be just.

What are our greatest strengths as a company?

One, for sure, is that somehow we've collected a tremendous number of very dedicated, very capable people into the organization. To me, this is number one. It **is** the company—the guts of it.

I'm thinking that as a group we expect more of each other than many organizations. We expect a lot; therefore we **get** a lot—that's been my experience here.

Everywhere at Tek you try to make the job as large as possible.

How much leeway do you allow manufacturing people to innovate?

We sure **try.** As we get larger and more bound up in our systems, it gets harder. But it sure will be one of my goals, and of the manufacturing organization, to use the knowledge and information of the person doing the job to advance his career and enlarge his job, as he sees it.

Everyone has the privilege—the **responsibility**—to upgrade his portion of the manufacturing operation.

Ideas for instrument mods, for example, come from other areas than Engineering. They continue to come—the great number of them—from people on the line.

Do you see any weaknesses at Tektronix?

One problem I see—sure it's a weakness—is that, for whatever reason, there's a tendency for an organization not to expose what it's doing. In this way, we sometimes don't make maximum use of our ideas and talents.

To have the privilege of operating with some freedom, which by and large everyone wants, you **must** make those around you aware of what you're doing. If not, their defense mechanisms come into play immediately. If you **don't** know what a guy is doing—and if his output isn't 100 per cent good—you may not trust him. But if you know, you feel free to run the risk with him. If all you can read is his output, you don't know **what** risk you're running.

What do you think is the worst misuse of staff?

Abandonment of a function to staff—putting staff **between** the subordinate and the superior. If you get to the point that the subordinate fears, or reports to, the staff man, you have severe problems. It's plain unjust. I can't **imagine** it being logical.

A staff guy better get his kicks out of making some line guy look good, get his rewards out of helping the gal who's putting something together or the man testing.

What are the goals of the manufacturing organization?

Sure I can say, "I want a flexible organization that continues to take the output of Engineering and manufacture it efficiently and to a consistent high quality—and one that grows people." Every manufacturing philosophy says the same thing.

I do want an efficient function, and each person in it competent—more competent than his counterpart in competitive companies, whether he be a rotex operator, a wirer, a scheduler. . .

Really, all you've **got** is people. They're the greatest computers in the world. And it's so damn inexpensive for us to grow them.

My immediate plans are to get the operators to spell out their problems and what's needed to solve them. Then, organize in the best way to accomplish these goals.

One thing we need to do is plan for longer-term growth and longer-term solutions. We tend sometimes to get procedures developed only to put out fires, and they often become standard operating procedure. As managers, we have to get into a position to think, "Is it the best solution?"

Another thing we have to do is a better job of spelling out overall responsibilities. This better be one of the first things, too.

What are some immediate manufacturing problems?

The length of the manufacturing cycle is one. I'd like to get it shorter. The longer the lead time, the greater our exposure. We need to react faster and follow customer needs more closely.

How will having a single manufacturing organization improve relationships with Engineering and Marketing?

Various functions need coordination. For example, Manufacturing Staff Engineering now will be able to make statements for manufacturing as a whole. Up to now, outside organizations haven't known where to get manufacturing answers. Often they have received three **different** answers.

It can't help but lower manufacturing costs and improve quality.

How much autonomy of operation should an area have?

An operator is pretty free, within his responsibility, to organize as he sees fit. He **must** grow people and he **must** operate at some efficiency.

He's free to take risks to the degree that he's not affecting some other area.

You can't take risks in an area you can't cover for.

For instance, some company policies you can't take a risk on. You can't go outside them, but within them you can—and should—do things to improve and increase your responsibility. You have to be careful, though; if you take a risk that will affect someone else, you have a responsibility to get his approval first.

What when two of your managers disagree as to whether to take a risk?

That's what I'm paid for.

Do you see a genuine willingness in the company to accept changes?

I think there is—in fact a darn good one. When you make people aware of the consequences for the **whole** organization, they will even subjugate their own interests. But you've **got** to let them know.

We've spent 14 years training people to speak out strong when something goes wrong. So you have to explain the reasoning behind a change. Then people, if they can, will get behind you. At Tek we see tremendous loyalty—to the company, to individuals, to each other.

Often we're forced to make a change on the spur of the moment, and have no opportunity to explain. In these cases, really what you're asking your people to do is to run on faith. A lot works out if you know and trust each other.

How do you develop this trust?

One, give the benefit of the doubt, especially to a superior. It's also important to support an outside area when you hear a grumble against it. It's so much fun sometimes to get a guy down and jump on him. . .

What is the proper function of committees and similar groups in a manufacturing organization?

There have been some pretty successful committes—usually short-term ones (like the steering committee).

A committee usually is composed of people from different responsibility areas. To make it work there must be a common goal, one that each sees so clearly that he will subordinate himself to it. But a committee, once it does what it was formed to do, will fall apart because the goal is gone.

I think this says that for one-shot problems we can get a lot of work and information from various areas—and in useable form—from committees.

In those few cases when you find a **decision** emerging from a committee, however, you find some one person on it assumed the responsibility.

You talk about the idea of "risk" and a manager's right to take risks. Is this an important concept to you?

Yes, it's important to me.

There is **no** decision without an inherent risk. That's why we must be careful to see that decisions are made at a level which can **assume** those risks. Not too far up, or too far down, in the organization.

Say **I** were to decide whether Unit Wiring should use a particular workbench layout. This is completely inappropriate. I don't know that area's internal needs, nor do I see the effect of my decisions there.

It gets back to this thing about mutual trust. When I do a ridiculous thing, I need an organization that's free and willing to come and tell me.

Do you feel you have that kind of organization now?

I think we have, pretty well. I don't known anyone who's scared to tell me what's on his mind. Sure, I get mad sometimes, but no one's ever been hurt by telling me off. They **do** it often enough. . .

And I've learned a tremendous amount.

We need an organization in which people **want** to tell you, and ask for clarification, and know you'll help them get out of trouble.

How do you gain this sort of rapport when you lack direct contact with so many employees?

It's each manager's responsibility to accomplish it. We must have working relationships so that subordinates **do** have freedom and mutual trust.

One problem we **had** in the company was lack of mutual trust. Fitz (as domestic general manager) did a tremendous amount of good in this regard.

One reason my job was created was to continue this trend toward greater mutual trust. It takes a lot of personal work.

Will this be a major area of your own personal effort?

Absolutely. I'd like to see the same degree of freedom, understanding and trust in work relationships among major areas as you find among, say, departments in a division.

What factors affect a manager's ability to delegate?

A manager may be afraid to delegate because he can't stand to have criticism placed on him by a subordinate getting into trouble.

If you're going to ask for support and loyalty, you don't get it by having a title pinned on you. One way to **earn** the support is to truly delegate, and then ride with the results of the guy you delegate to—including his mistakes.

Do we ever overdelegate?

I don't know if it's overdelegation or not. It may be we don't put sufficient importance to certain responsibilities.

I think, for example, of forecasting. For years it wasn't considered important enough, and so it was delegated—or abandoned—down the line so far that the risks taken there were out of order.

This was back in 1959, when Kevin VanHoomissen and I did all the forecasting. Our influence was completely out of line compared with our responsibility.

What are the effects of Tektronix' fast growth on today's problems?

Certainly growth has accelerated the basic problem of tending to have inexperienced managers. . .

What were the company's choices other than grow its own managers?

Haul them in from outside. In my opinion, we're far better off to take green managers than outsiders.

How did we develop the extreme quality-consciousness we have?

I think the founders **started** it—set it as an objective, and it stuck with us. One of the things we have to sell is quality.

Quality Assurance does not in itself create quality, but it's one tool we use. You **do** get quality by each individual putting extra concern and extra personal care, into Engineering, Manufacturing, Marketing. . .

Quality is not only in our box but in the way we treat customers and vendors.

Why do we have more quality-consciousness than some other firms?

People **like** to do a good job—I really believe this; a psychologist could explain it better than I. It involves what they think is important. Our reward and criticism system is part of it—not what really causes it, but what supports it.

"Do your best" may be a corny saying, but our people believe it.

It goes back to what kind of company Howard and Jack wanted to start: One which would produce a quality product in **all** its aspects. This concept has gone, as these things will, into every part of the business.

We have to be aware of this, and careful not to lose it or to sacrifice it for short-term goals.

How do we combat the attraction of short-term goals?

We need to restate and redefine our long-term goals. Sometimes they're not spelled out by supervisors, because they're either not knowledgeable or don't take the time.

We could overdo this, I suppose, but fewer companies get into trouble overdoing long-term thinking.

This business of short-term gain comes up **very** often in a profit-sharing company.

We may take alternative A for its short-term benefits, and then in time find that alternative B would have solved the problem with the same efficiency and meshed better with our overall approach. Long-term goals don't mean less short-term efficiency.

How much does our informal atmosphere contribute to company success?

It has contributed a whole lot to what we have. Maybe in some isolated instances it's taken advantage of, but in any balance we're way ahead because of it.

It makes working here a pleasure. You can't buy this feeling. The returns on this investment are tremendous.

Does this atmosphere change as we grow larger and less flexible?

You've got to continuously work at it, that's for sure.

We're bound as we grow bigger to get some individuals from different business societies. We've got to be careful that they do adapt to what we feel **is** our way, so we can keep the kind of company we started.

We try to keep the basic values, the informal atmosphere—those things which are important to us—and not let any individual or group of individuals destroy them.

Aren't changes in the way we do things acceptable?

Sure, surface aspects—the shallower things—can and should change. Leaving our cash out, that can change. It's not the important thing. It's the thought and the basic concept behind it that we can't compromise or destroy. But change the way we **manifest** these things? Sure.

From time to time people with different values **will** challenge our ways. We have to be careful. We mustn't go looking for dragons in the attic, but we **can** insure that the things important to us, as a company, are made known.

How can you do this?

It involves mutual trust—we're back to that again.

It would be wonderful if someone could put these values down, in some form, to make them known. They are the kind of things you learn early at Tektronix; they do rub off. So many of them boil down to the basic moral beliefs of Tek society.

It's important that a guy not be 180-out on basic things. An organization can't absorb him. It **can** accept differences within limits, but not when they're diametrically opposed.

We've lost some of these people, sure; we should've lost more.

You've spoken of risks accompanying each decision. What risks do we run by emphasizing a concern for people?

The risk you run is, frankly, that you're open for competitors who lack this concern to take advantage of you and your people. Not that they **are,** but they **might.**

It boils down to a competitive thing. Companies who don't care about people or the state of the art—who have what I'd call short-term goals—can threaten us. But if we're strong and use this threat as a further stimulus to drive that much harder, it may be a real advantage to us.

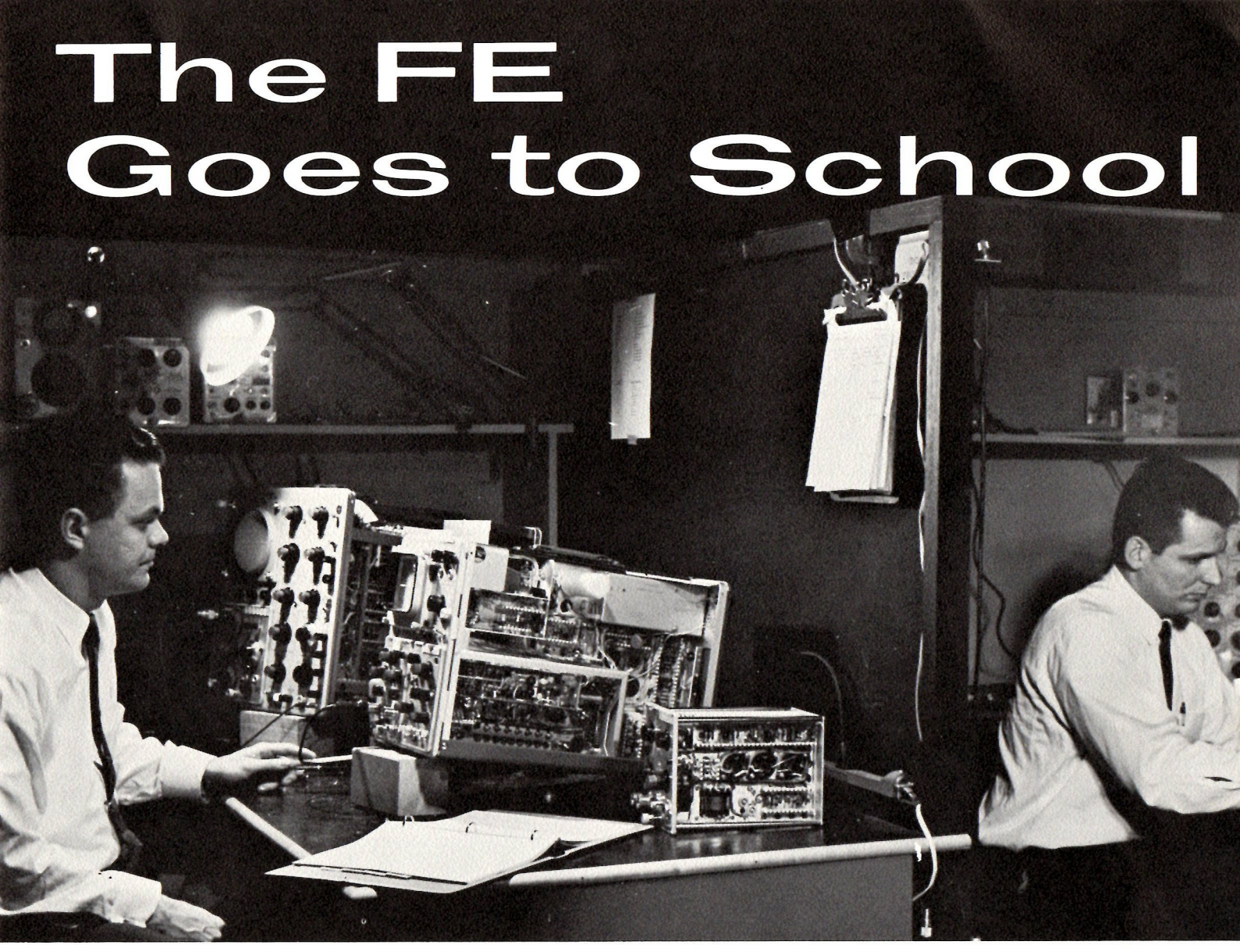
Sure they can hurt you—temporarily—if you're not basically strong.

Then you feel internal abuse of our system is no major risk?

If some employees take undue advantage of our atmosphere, it isn't many. And our informality, our concern over people, in no way means we're not going to be just.

And, as I said, "justice" means just **exactly** that. . .

The FE Goes to School



By KEN IRELAND

Even a highly technical business like ours must sell. And so we do, but we don't have "salesmen" operating door to door. We have instead energetic representatives who give advice and assistance, talk about problems with customers and help service instruments. They need no gimmick to get in the door; as technical consultants, they are always welcome.

A field engineer must know his business, for he will work with a customer many years and must make no unjustified promise. Our sales are built on the company's reputation, and that reputation depends not only on quality of instrument but on the field engineer's impact and effect on a customer. Thus training the FE candidate becomes a vital task. An FE must be more than a technician or design engineer with a suit and expense account . . . he is in fact a different person, and his interests and abilities overlap only in some ways.

Charged with the important task of training field engineers, field maintenance engineers and some customers is Rollie Smith's Field Training group, a unit of Field Engineering, managed by George Edens, which is in turn a function of Domestic Marketing. Field Training devises teaching curricula, sales aids, catalogs, films, slides, drawings and training aids for field use; gathers information; instructs; and in general prepares the field engineer candidate technically and psychologically for battle in the Big Out There.

* * *

"Effective teaching," Rollie Smith says, "is an expensive and complicated process. For example, we have probably over a quarter-million dollars worth of Tek instruments in our inventory, because they are needed to thoroughly train customers and field engineers."

But the determining factor is not money. What **is** important to Rollie's staff is understanding teaching methods and learning processes, and knowing the important differences in methods that will result in "I get your message" instead of "I **think** I see." Training programs based on a thorough instruction in the technical material are adapted by the training specialists to fit the individual field engineer candidate's temperament and needs. The goal is training in-depth, a concept advanced over expose-and-memorize techniques.

The Field Training group's philosophy of teaching is: The student is a part, not a product, of the course. An open-discussion approach designed to accomplish definite objectives appears the most productive way of learning; students are subjected to conditions similar to those in the field. The atmosphere becomes stimulating, students more responsive. The "objectives" are mostly related to the understanding and uses of Tek instruments, and will vary from course to course. The general scope of the course is determined by FE's region manager, but the trainee himself must take the responsibility of planning his course, with the training specialists' help.

The goal of each course is that the trainee prove in oral examination his ability to solve problems, meet "testable and communicable" objectives previously set for the course, and demonstrate his ability for self-appraisal.

Field Engineer Versatile

The graduating field engineer (who must have an electronics background to begin with) might check out on more than 135 instruments. He can analyze and understand the characteristics and waveforms of most circuits; the limitations, uses, and effects of a scope on other electronic systems and vice versa. With

these abilities, he can determine which instruments will best fulfill a customer's need.

He understands the specifications of our instruments, is able to calibrate some and repair others and is acquainted with Tektronix policies. More than this, he is expected to keep up with the state of the electronics art in general, to be personable and friendly, and to be able to talk easily and clearly about technical details.

Tektronix policy that we will service any Tek scope no matter how old makes the job harder, for we continually obsolete models and introduce new ones. But knowledge of old models must be retained.

FT Has Other Services

Today's complex technology requires that many of our customers must know our instruments more completely than is possible through FE visits or reading the manual. So customer training, arranged through Field Engineering, is a part of Field Training's job. Most "customers" are calibration engineers, technicians or calibration lab supervisors. Training specialists become customers' hosts for the duration of these courses—courses whose length depends on the material to be covered. Because of the variety of customers there will be a variety of customer courses, none quite as complicated as the FE trainees', but all of them hard work.

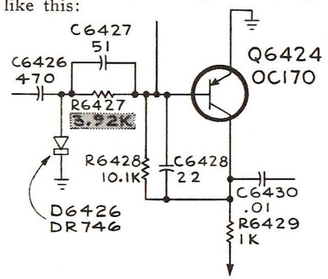
When appropriate and when asked, Field Training sends instructors and equipment out to the field. "We cannot," Rollie points out, "just invent courses and foist them on candidates, nor would we want to. We are a staff function; we perform when and where requested. We catalog the courses we have, and field engineers and others request them as they feel the need."

Training Aids Designed

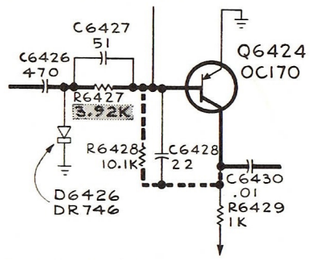
Rollie's group has designed classrooms and developed teaching aids calculated to be as direct as possible and to focus attention on the subject. The new classrooms, carefully soundproofed and equipped with lighting control panels, dimmers and slide projector controls at the instructor's blackboard, are examples of attention to detail. Small spotlights are arranged in a semi-circle over the front row—in fact, everybody is in the front row. The instructor can brighten or dim the lights to provide illumination without "whiting out" the oscilloscope traces or blanking out slide projections.

The blackboards are metal. Small (3″ x 4″) component boards, designed by Training Specialist Archie Brusch, snap on with small magnets. Each component board has one electronic component or tube; by connecting the boards with short plugin cords, circuits can be built in seconds and their effects immediately evaluated with the oscilloscope trace. Many of the instruction techniques were developed through liaison with the experimental classroom program of Oregon College of Education in Monmouth.

Emphasis on clarity and quickness of comprehension shows up again in the way instructional circuit diagrams are drawn. Electronic diagrams usually look like this:



In this drawing, however, the signal path, feedback paths, etc., are shown by dotted or dashed lines:



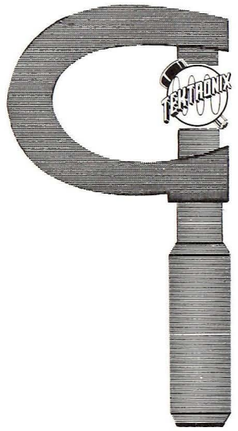
To help the FE learn and show, Field Training has developed a catalog of notebook pages (similar to the electronic circuit shown here), slides, transparent projections and film catalog. During the last eight months Field Training has shipped over 29,500 fillers, 2600 35 mm slides and 50 transparent projections.

They also build demonstration kits, like the handbag-sized demonstrator which lets the FE illustrate the programming ability of the Type 567 digital readout oscilloscope. (On the 567, trace quantities can be shown directly as a series of numbers. This scope can be "programmed"; that is, connected by patch cords to readout parts of the trace as numbers. Thus it can be read by a relatively untrained person.)

Rollie says, "Our customer load has doubled in the first year, and will continue to increase swiftly. The problem is, how to teach more people about more instruments without drastically increasing expenses and staff. New instruments add two weeks per year to our courses. Our best bet so far seems to be programmed instruction and teaching machines,* to take over part of the load.

"Several people at Tek are working on teaching machine programs; we hope to have the first five weeks of our present courses programmed in three years. This is a continuation of our search for better methods."

* Teaching machine: Usually a simple box-like device, containing a carefully organized course, which allows the student to proceed at his own pace. Experiments in universities indicate that it is a fast, efficient teaching method.



quality assurance helps fulfill Tek creed of unexcelled scopes

By DICK KOE

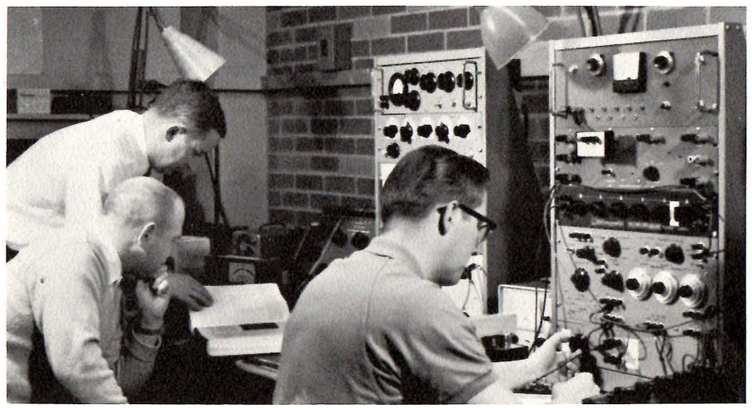
A shipment of Tektronix finished goods stands on the warehouse dock. Its destination: Tek's Instrument and Accessories Quality Assurance lab, where these products will be inspected for quality and acceptability.

Next to the finished goods are cartons of components, parts and materials, Tek-made and purchased. Their destination: Tek's Components and Materials Quality Assurance group, where they will be checked for conformance to specifications.

These inspection areas form part of Tek's extensive quality assurance program, directed by Frank Kopra and his 20-member Manufacturing Quality Assurance staff, formerly Domestic Operations Quality Assurance (DOQA). Organized in September, 1961, the group has the responsibility of verifying that Tektronix products are acceptable to our customers.

Once the MQA staff inspects a sample of finished goods, components or materials, they evaluate and compile the data. These reports are routed to each manufacturing area—Fabrication & Molding, Instrument Manufacturing, Cathode-Ray Tube—and to Materials Management, Marketing and Manufacturing Staff Engineering, noting quality problems and requesting corrective action.

MQA's Measurement Standards group certifies Tek's test equipment traceable to the National Bureau of Standards. Dave Barr (left) and Al Crane check reference material as Doug Robart (right) calibrates a decade-resistance box for the Resistors department.



Tek's quality assurance program includes another and probably more important evaluation. The MQA staff consults operating managers and their quality assurance and quality control personnel to assure that adequate quality control systems are in use, helping these managers improve their systems when necessary.

MQA also monitors field information reports on the condition of Tek instruments once they reach customers—the possible defects and types of repairs and service made periodically. Assisting in this task are Marketing's field engineers and the Field Information group.

MQA also inspects products manufactured by Tektronix Guernsey Ltd. and Tektronix Holland N.V., using samples from their production lines. The same test criteria for US-made goods are applied to Tek's European products. The findings are reported to Tekintag.

An additional MQA staff responsibility —inspecting supplies purchased on contract requiring US Government Source Inspection—was given to Materials Management and Instrument Manufacturing last March. MQA assistance, however, is always available.

MQA Has Four Groups

To coordinate these responsibilities, Frank has organized his MQA staff into four groups: (1) Instruments and Accessories QA; (2) Components and Materials QA; (3) Measurement Standards and Product Reliability; (4) Quality Control Systems Evaluation. Each group is headed by a specialist and assistants.

Rod Kennedy directs Instruments and Accessories QA. He and his staff insure that saleable product specifications are adequate and consistant, and recommend changes when necessary. Rod also samples all types of saleable items to determine whether they meet specifications, helps resolve conflicts on these matters and analyzes field information on instrument failures and troubles.

Components and Materials QA is headed by Rich Murtagh and his staff, who determine whether established specifications and workmanship standards for all components and materials are acceptable. They also insure that components and materials meet established specifications and standards, and help solve components problems which cannot be solved at the manufacturing levels.

Rich maintains a laboratory to check component samples for quality and acceptability, and is at present conducting a study on component specifications. He also analyzes field information and customer orders to confirm data on component defects.

Quality control and inspection systems in Tek areas are checked by Ken King's Quality Control Systems Evaluation group to insure that they are effective. Ken recommends improvement in these systems when necessary. In addition, his group determines whether the systems meet the contract specifications required by US Government Source Inspection, and provides service and facilities for the Government QC representative.

Reference Standards Provided

Dave Barr's Measurement Standards and Product Reliability group fulfills two responsibilities. The measurement standards function provides Tek with laboratory reference standards traceable to the US National Bureau of Standards. Standard voltage cells, resistors, capacitors, precision thermometers and light sources are maintained in a temperature and humidity-controlled laboratory together with equipment to make transfer measurements.

Competent engineering personnel conduct measurements and calibrations to provide the NBS-traceable certification on Tek's test equipment. Lab personnel also answer many customer inquiries on the use of our products in standards laboratories.

Product reliability is an important part of Tek's quality assurance program. Using "state of the art" techniques, the program provides failure rate data on Tek products. This permits monitoring the reliability of Tek products as a function of quality. The data are then forwarded to Instrument Design Engineering and Manufacturing Staff Engineering.

All MQA staff groups are housed in the northwest corner of Plant IV in Building 47.

Although MQA is only a year and a half old, quality assurance and quality control at Tektronix began at the company's outset in 1946. To manufacture precision instruments and maintain the Tektronix emphasis upon quality demand a constant check on components and parts as well as completed instruments.

A vigorous program of quality control and assurance helps to fulfill Tek's creed — "serving Tektronix customers with products and policies that are unexcelled in the electronics industry and limited only by the current state of the art."

Frank Kopra has been a leader in Tek's quality assurance program. A graduate of Portland's Multnomah college, Frank began at Tek in May 1951, working in Test on swing shift while his wife, Jean, worked the day shift in Unit Wiring. In 1953, Frank became part of the Test Quality Control group, and managed the group later that year.

DOQA Formed In 1961

Frank joined forces with the Production Electronics group in 1959 to develop better methods of introducing instruments into production. He maintained a QA function attached to that group. As Production Electronics became functional, it was changed to Instrument Manufacturing Staff Engineering (IMSE). In 1960, Frank formed the Product Quality Assurance group which was later named Instrument Manufacturing Quality Assurance. Domestic Operations Quality Assurance (DOQA) evolved in September 1961, when Bob Fitzgerald, then domestic general manager, asked Frank to form a staff for the entire domestic operation. At present, MQA reports to Mike Park, Manufacturing manager.

The quality assurance function formed in 1959 had a single purpose—to coordinate the activities of all Tek QC groups. As the company grew and more areas added QC and QA functions, the need for general coordination, policy and systems modifications was apparent. Frank's QA function filled that need.

MQA was organized in 1961 for three purposes: (1) to determine the acceptability of all products Tek sells; (2) to determine adequacy of QA and QC systems, assuring that all products from vendor—through all stages of manufacture —to customer meet quality expectations; and (3) to help formulate and implement procedures for assuring product quality.

FRANK KOPRA directs Tek's Manufacturing Quality Assurance (MQA) program.

Although MQA works closely with QC and QA functions in all Tek areas, it does not supervise them. These functions are responsible solely to their respective areas. Frank explained: "MQA does not operate the quality assurance and quality control functions for the line operations. Our relationship is to survey these functions, study their operating procedures and evaluate systems performance."

In evaluating the functions, MQA notes: (1) Specifications for parts and processes; (2) Inspection procedures that list the characteristics to be inspected; (3) Controls to assure that only current specifications are used; (4) Programs to assure accuracy of measuring and test equipment by comparison with standards traceable directly to the National Bureau of Standards or indirectly through approved standards.

(5) Inspection procedures that provide instructions to inspectors; (6) Records of inspections performed and corrective action taken; (7) Systems to assure that all incoming materials are subjected to a planned acceptance inspection; (8) Systems that perform inspections at the earliest possible time so that defective processes may be located and corrected before they have produced large quantities of defective parts or assemblies.

(9) Systems that perform final inspections to assure that outgoing lots of products conform to the specifications; (10) Systems for identifying the inspection status of products.

The results of this evaluation are reported and recommendations for additions and changes are submitted to the line managers, quality assurance managers, and manufacturing manager, as appropriate.

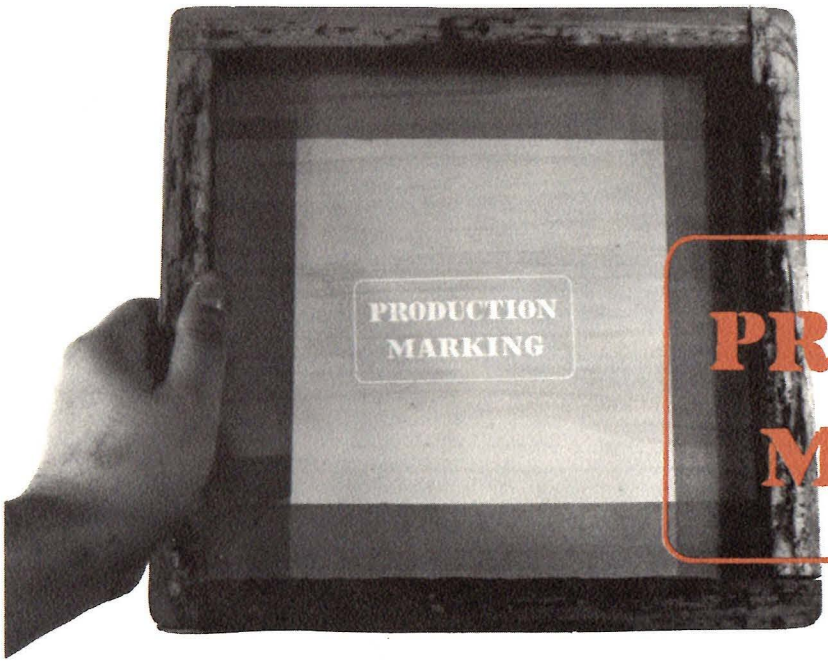
Aim for 'Economical' Quality

Frank also explained how he feels about quality and how QA can best function at Tek: "Quality standards mean excellence of engineering and workmanship, conformance to specifications, constantly improving instrument performance, good customer service, and always striving to give the customer the best value. Tek can always get quality by spending lots of money, but this is not quality in the proper perspective. We must aim for the most **economical** quality.

"An ideal quality assurance program at Tek requires communication and understanding among areas. We need coordination among groups to better maintain the quality level. But it should be done in a manner that does not remove responsibility from each worker. To gain this coordination requires understanding."

At present, the most urgent MQA project is to compile operating procedures from all QC and QA functions—how they operate and how they are organized. This information, in conjunction with surveillance and experimental tests, will give an indication on "where we are and where we need to go, as far as product quality is concerned."

On this basis, Tek can truly fulfill its pledge to serving its customers with products "unexcelled in the electronics industry."



PRODUCTION MARKING

By WILLIE HENNING

Often when writing about producing and marketing oscilloscopes we describe the glamorous-sounding areas—Research, Engineering, International. . .Yet making an oscilloscope also involves many production processes from research and design until the product is marketed. Each production step is important.

Like many other processes, production processes are constantly changing and improving, thus making the company more profitable. In Fabrication & Molding one such group is Production Marking.

Production marking is placing nomenclature (part numbers and so on) on required Tektronix' internal and some external parts, front and rear subpanels and rear overlays.

Other operations of the group include minor assembly, such as installing eyelets, installing pemnuts, riveting, tapping, drilling and minor mechanical assembly. Then all parts are packaged and sent to the warehouse for shipment to assembly areas.

Another service is making all company rubber stamps for office, warehouse and other uses.

The group is headed by Harlow Loucks, who came to Tektronix in April 1953. He started in Printing and worked there until he transferred to Production Marking in January 1959. Recently Harlow has added to his responsibilities by being named manager of Metal Finishing, which includes Production Marking, Paint, Etch, Weld, Packaging and Minor Assembly.

Tektronix started marking parts in 1946 when our only oscilloscope was the 511. Parts were stamped with rubber stamps. This was slow and painstaking. Use of silk screening started about 1952. When used, the screen is placed on the area to be marked and paint poured on it. A rubber squeegee is used to pull the paint across the image area, forcing paint through the screen onto the part. These steps are repeated for each part to be marked. A screen is made from silk stretched tightly on a wood or metal frame. Several different processes with the use of sensitized film and mylar (plastic) make the image. This takes considerable time.

However, silk-screening is much faster than rubber-stamping parts, and much more permanent. One person could screen about 400 to 750 parts in an eight-hour day. Each silk screen could print about 1000 parts before wearing out.

By 1959 the company had grown considerably and produced a larger variety of instruments, thus more kinds of parts and more of them.

In 1959 we decided to try to convert to marking parts with a regular printing press, designed to print on thin sheets of paper. The problem: To convert this press so it would mark on thick, irregular metal parts.

Platen Press Used

Using a standard 50-year-old platen press that cost $300, Harlow and several others tackled the problem: Converting the press to handle oddball parts.

How can you feed the metal parts into the presses? How can you print on irregularly shaped parts? What kind of ink is permanent, yet fast-drying and able to withstand washing and other finishing processes? Knowing that paper absorbs ink and the silk-screen process lays on a thick coating of paint, they needed to find inks that would adhere to metal, plastics and many other types of material.

The mechanical problems to make a printing press workable were not too bad. It required alteration of the press, cutting it down here, building it up there. However, making plates was the main problem. Platen presses are designed to print from raised surfaces (they could be typeset forms, engravings or rubber plates.) But to take irregularly shaped parts into the press and make a plate to fit them was the difficult part. Plates had to be made that would fit the parts—and made at a feasible price.

They made plates with wood blocks, a layer of sponge rubber and finally a layer of rubber. The letters to be printed were raised on the rubber layer. This made the plates flexible and able to handle the odd-shaped parts.

Faster Marking Possible

With the use of the press, parts could be marked at the rate of about 2400 to 3200 per day; while silk-screening marked only about 400 to 750. This meant that press-printed parts could be done five to one. Only a few parts are still silk-screened: CRT shields, rear overlays and certain other parts that won't fit the presses.

After placing nomenclature on all parts they must go through a drying process. This is a large oven in which parts were placed to dry after printing.

Silk-screening still is a valuable process because of its versatility. It can be used for working any shape part.

After presses came into use, marking began to be so fast that mechanical finishing (pemnuts, rivets, etc.) could not keep up with printed parts. So, solving one problem caused another.

The group got together with Manufacturing Engineering of Fabrication & Molding and designed new machines for installing pemnuts, eyelets and rivets, the machines fed automatically. At this time there were no automatic feeding machines on the market that would fill our needs.

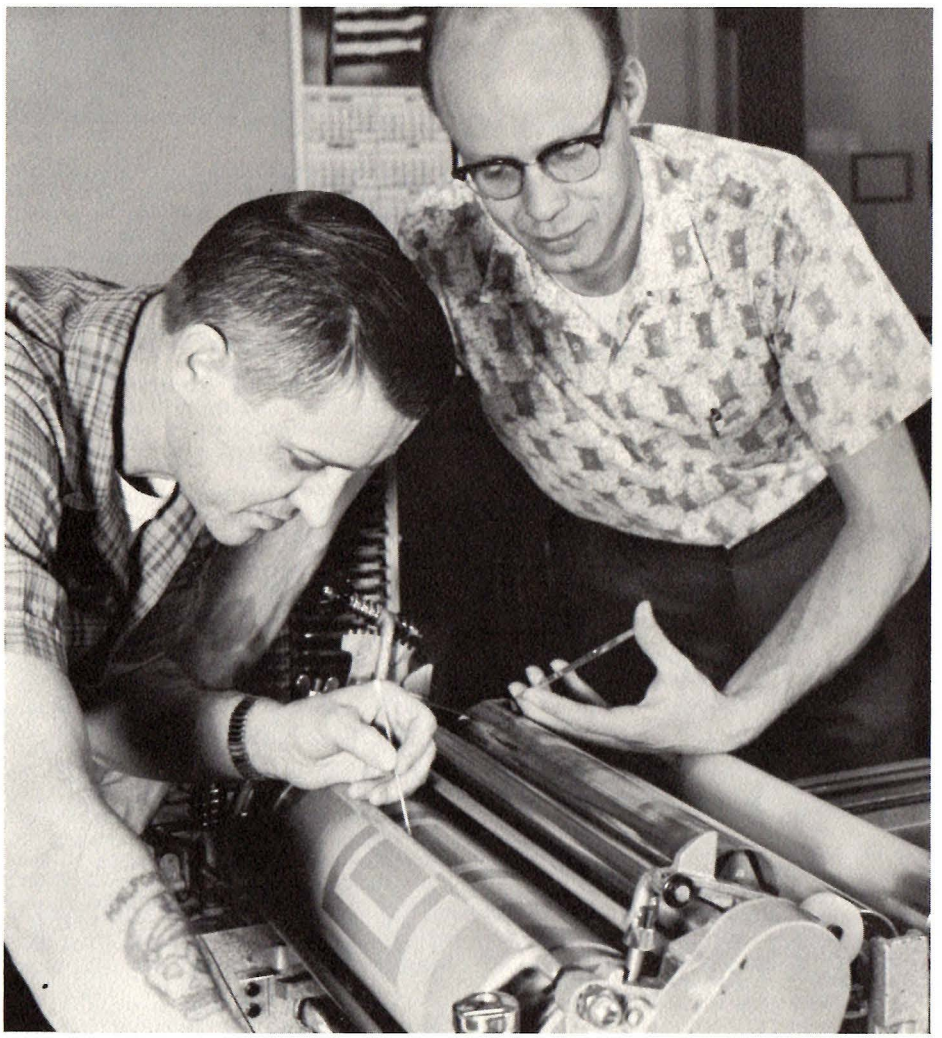
The marking (printing) and mechanical processes were now working well together. This raised still **another** problem: All packaging (wrapping parts for delivery to the warehouse) was being done by hand, and packaging was falling behind. Packaging was helped by purchasing a polybagging machine. This machine packages many of the parts. Parts only have to be fed in, and when they come out they are packaged.

Parts Moved On Conveyor

Until recently all parts were moved within the area on push carts. Much time was spent loading, unloading and pushing. About two years ago thought was given to building a conveyor system, to eliminate most carts. The conveyor would run from the presses, through the drying oven, past mechanical assembly and to the packaging machine. The conveyor was designed and built at Tektronix and is now in use.

Now, still another conveyor is in the thinking stage. This conveyor would run from the Etch unit to the presses, minor assembly or packing (depending on the operation required in Marking; see sketch). This is one future project.

Another new method is use of a flatbed offset press that prints graticules on the back of glass CRT faceplates of our ceramic tubes, used in the 561A, 564 and 567. The old method involved slow and careful engraving on plastic. The important gain by marking in this manner is eliminating parallax. (if you look at the old type CRT from an angle the beam appears to be in a different spot on the graticule, this is caused by the distance between where the beam strikes the phosphor and the graticule). Because the printed graticules are **inside** the new CRT the electron beam actually strikes exactly on the printed lines.



FRANK BALL (left), Production Marking, and Harlow Loucks (right), Metal Finishing manager, check a glass CRT graticule as it is printed on the flatbed press. The new method is much faster and more economical than the engraving of plastic graticules.

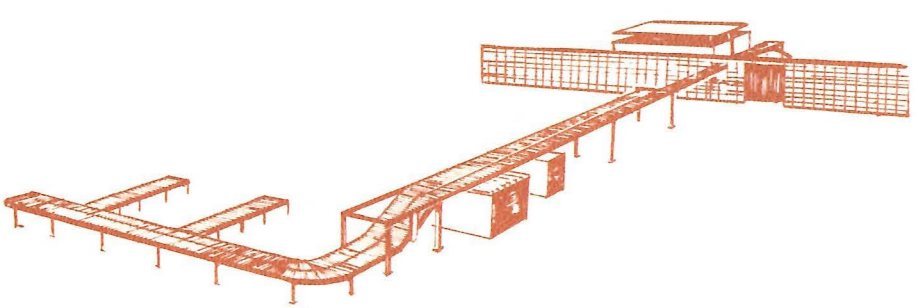
Production Marking has progressed a long way in three years, with new presses and new methods. Even though printing by press three years ago was made operational in a fairly short time, marking is a job that will never be finished; something new is always coming up.

However, certain old methods still are useful. Printing isn't economical for every part; therefore silk-screening still is used. Plates cost less for a long run because one plate will outlast many screens; each plate will work about 15,000 parts and a silk screen about 1000.

Idea Source Unimportant

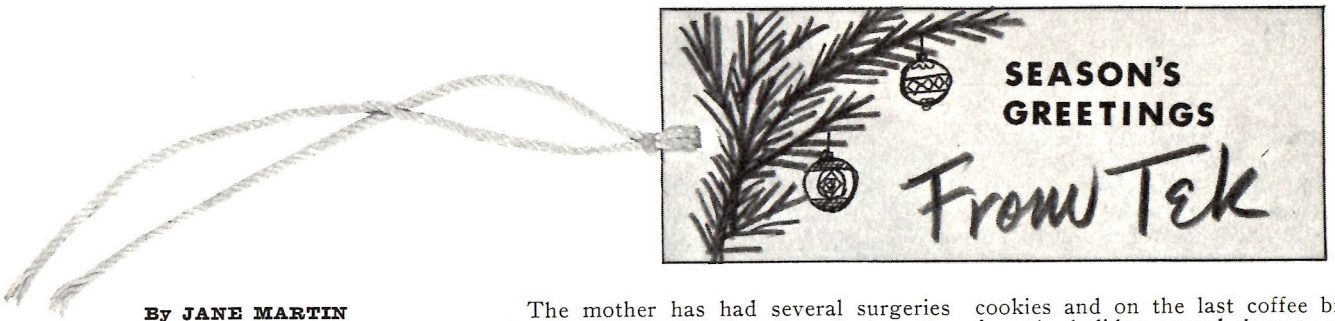
"We don't care where ideas come from", Harlow states. "We consult chemists, printers and people in the metal-working business. This is a fairly new field and we keep looking for hints."

Right now they have an eye on another new patented method, electrostatic printing. This process transfers a mark to almost any surface by electrostatic charges that control the powdered ink through a space between the screen and the surface to be printed. The screen and part that is being printed never contact each other. This process can print on surfaces as fragile as light bulbs, corrugated paper or avocados—which normal presses cannot do.



Production Marking always considers the future. Someday there will have to be more semi-automatic and automatic equipment for marking, cleaning, inspecting and packaging. In the thinking stage, for example, is a machine that would receive, position, print, dry and package, all without normal handling. However, it is **only** in the thought process.

But this is the pattern: Ideas, design, use. And then **more** ideas.



By JANE MARTIN

Tektronix shares its earnings with its employees—and employees are sharing their earnings with less fortunate people. This fact is evidenced each Christmas, as individuals throughout the company dig deep into their pockets to share as much as they can—and provide the ingredients for a merry Christmas for those who can't manage alone.

Christmas projects for the needy are not new this year, but to some extent have been a part of Tek activities for many years. To many employees, giving to others is as much a Christmas tradition as hanging stockings by the fireplace and eating turkey.

Typical of Tek groups who raised funds for needy families this year was Facilities. With the help of the Salvation Army, a family of eight (six children ranging in ages between 4 and 16) was located who needed and deserved some special help at Christmas. After delivering a large supply of groceries, including a turkey, members of Facilities found that the family's stove worked only slightly and the oven didn't operate at all. Ross Hood found an electric range at no cost and Dave Rowe cleaned, rewired and painted it to convert it to a sparkling, turkey-worthy stove. Joe Martin and Ross delivered and installed it. In addition, the group provided a new coffee table (handmade in the shop), two refinished end tables, two CRT lamps, clothes and toys for the children.

The mother has had several surgeries for cancer, broke her leg during the October 12 storm and has been in a wheelchair since. The father is on the long waiting list to enter Veterans' hospital for surgery before he can return to active employment. Large medical expenses and very little good fortune made it impossible for them to give their six children a Christmas. Perhaps the background of this family is typical of many families needing help—but although the story is familiar, the need isn't less nor are the frustrations of the parents any easier to bear.

Not Only At Christmas

Kit Prep has helped the same family at Christmas for the past two years, and continue to give aid throughout the year when it is needed. The young father (both parents are under 30) was hard hit by polio and only recently graduated from an iron lung to a rocking bed. Financial aid from a veteran's pension and through the March of Dimes has helped somewhat to provide for their three small boys—but only for absolute necessities—and "necessities" means different things to different people; shoes for the children, a dress for mother, pajamas for Dad—for such a family, these things aren't necessities—and neither is Christmas. Unless someone wants to share...

About 15 other groups at Tek were Santas to needy families this year—and saw children's eyes look truly joyful and parents' extremely grateful.

During the past several years, members of Central Staff Services have brought homemade Christmas candy, cakes and cookies and on the last coffee break before the holiday served them to members of the department. This year the sweets were brought to work as usual—but only admired from long range—and delivered to St. Mary's Boys School in time for their annual Christmas party, along with a cash donation of $50. Not a lot to give . . . . but very important to about 50 boys. Growing boys and homemade cookies go together.

People tend to think of wee children and teenagers when thoughts of Christmas sharing arrive. Oftentimes, the in-betweeners are nearly forgotten. At the Christie School these little girls call themselves the "Tweens." The Ceramics department made them feel very important by presenting them with a new television set. A letter from the children at the school (illustrated with crayon drawings of little people looking at TV) read:

"Dear Friends:

Thank you for the lovely television. We enjoy it very much. I wish there were more people in this world as kind as you. We watch TV whenever we can. May God bless you and keep you always. We appreciate your kindness very much. Thank you again.

The Tweens"

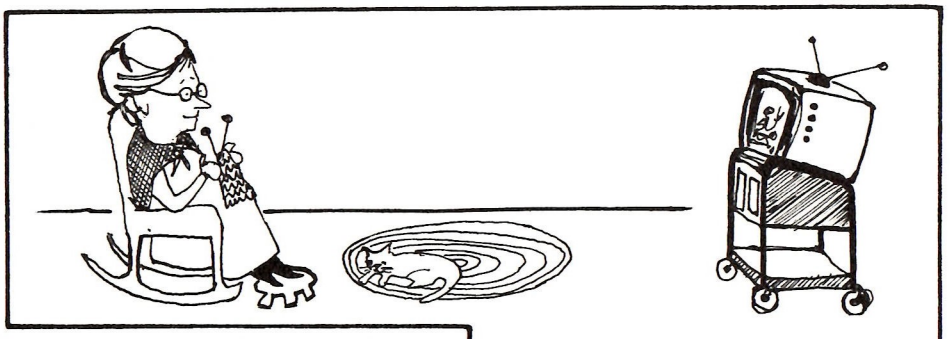
With funds collected at Christmas Ceramics will also support an orphan boy from the Birdnest Orphanage in Murabai, India. Each month for the next year they will send money for the boys' welfare.

Many Groups Helped

Throughout the entire company, auctions, raffles, cake sales and white elephant sales were successful in raising $3443.03 for the Washington County School for Retarded Children. Tek Foundation matched this amount—and $6886.06 was given the school at Aloha.

The Waverly Baby Home, Oregon State School for the Blind and the Happy Hollow Retarded Children's home all received contributions from Tek employees.

To the mother and father with small children, trying desperately to make it seem like Christmas at their house; for the boy or girl in an orphanage or school for the handicapped who has no one person who cares only about him; and for the elderly couple who haven't been remembered at Christmas for many years, the world looks brighter today. Because "the big company out at Beaverton" not only has lots of people working for it, but lots of **nice** people, people who sincerely care about others.



IN U OF O MEDICAL School's new Research building, a 11-year-old boy was staring at a Tek 565 scope in office of Dr. Blank.

"I got one at home just like that," he notified the doctor.

Oh, no, the doctor laughingly explained. This scope cost several thousand dollars and is very complicated, etc., etc.

But the kid started turning knobs, and adjusting the trace, and astounded the doctor (who hadn't yet learned to work the scope himself.)

Then in walked Russ Fillinger (Medical Instruments), who was visiting out in the hall, and told son David to stop playing with the doctor's scope.

FE GEORGE Obinger (Lafayette) reports he checked out some electronic equipment at a Sparks, Nev. installation of some sort or other called The Nugget Club. Sounds like it might have to do with the mining industry.

"I was told we couldn't touch anything," George says. "I.e., sound equipment," he adds.

After having to "endure" a show at the club, he was taken on a tour. "I.e., of the equipment room," he clarifies.

"I found the backstage part very interesting — i.e., the equipment," George goes on.

After correcting an imbalance in the audio, he left. "I'm not sure whether to make a return call, as I have doubts whether Tek health insurance covers eye strain," George concludes. "I.e., because of poor lighting," he explains.

WINTERWISE, it's been wicked, weatherwise. Along with the miseries, winter brought Tektronix a couple odd stories:

During the Columbus day blow, one Tek, to protect his rattling front window, lurched outdoors with a sheet of plywood to nail up. The wind tore the wood out of his hands and blew it through the window. Clink! it probably went.

Powerless Teks kept up their habits. They would enter a room and flick the light switch on, then flick it off when they left again. They would plug in electrical equipment, and then (optional) swear.

PRODUCT DIVERSIFICATION, should it come to Tek, may take strange forms:

West Los Angeles Field Secretary Peggy Wilson reports that last summer one 500/53A Scope-Mobile, shipped from Palo Alto, didn't show up in West LA.

Checking, they found that the carton had been delivered to a lady in Los Angeles, who unpacked it and was using the Scope-Mobile as a television table.

TEKS

MORE RECENTLY came the Big Ice. You could tell it was slick out that morning, folks, because the cat kept falling down.

We all slipped and slode, but only one Tek driver had precisely this experience: Headed down a steep hill near his home, his car turned sideways on the ice, skidded about 30 feet and bumped up against the curb. Out he got, set foot on slick pavement and continued sliding personally.

Picking up frightening speed on the long hill, he flung himself face forward and in that fashion made it all the way to the bottom, probably setting a world record for the 50-yard auto-belly relay slither.* →

A COUPLE WINTERS ago it snowed right into the IO building snack bar through the air intake, and drifted dandrufflike onto shoulders of unsuspecting coffee urn patrons. This bit of weather history never has repeated, though.

*an athletic event relatively unknown in the US, but popular in Russia.

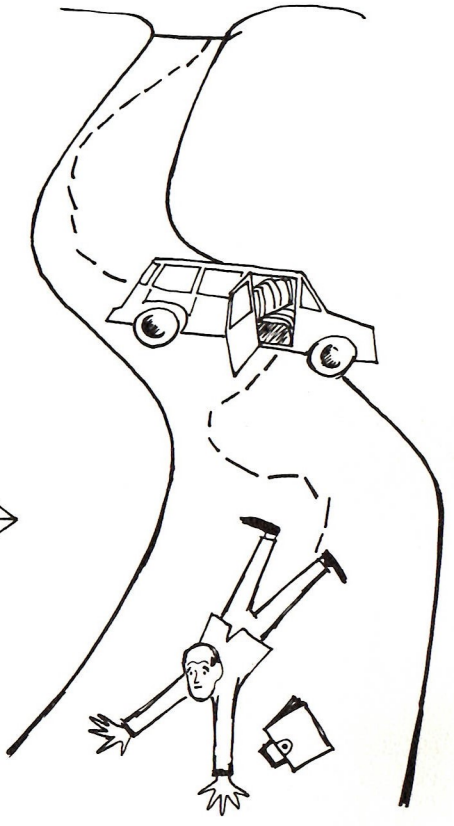
EDDIE RICHMOND (IMSE Specs), maybe prompted by icy winter weather, says this information about uniform freeway distress signals (for people with freeway distress) may interest folks, and maybe even help them:

1. Stop on the right-hand shoulder, way off the road. At night, turn on interior and tail lights—and the emergency switch, if you have one, on your turn signal.
2. If you stall in a traffic lane, place portable warning devices (blinkers, red flags and members of your family all qualify) on the road behind the car.
3. To summon help, hang a white cloth or handkerchief from the driver's window. Raise the car hood.
4. Stay in the car or near it. Don't leave it alone. Don't walk on the highway.

MORE STUFF, also from Eddie:

Of 100 typical stranded motorists, can you guess what percentage probably had mechanical trouble? had a flat tire? ran out of water? ran out of gas? Come on . . . . guess.

(ANSWER: 47 per cent, 33 per cent, 12 per cent, and 7 per cent, according to traffic studies.)



TEK NEWSREEL

(A summary of some of the major recent happenings on the Tek scene)

On November 30, the Product Planning ad hoc committee issued a final report listing the intent and general details of the Tektronix Product Planning system.

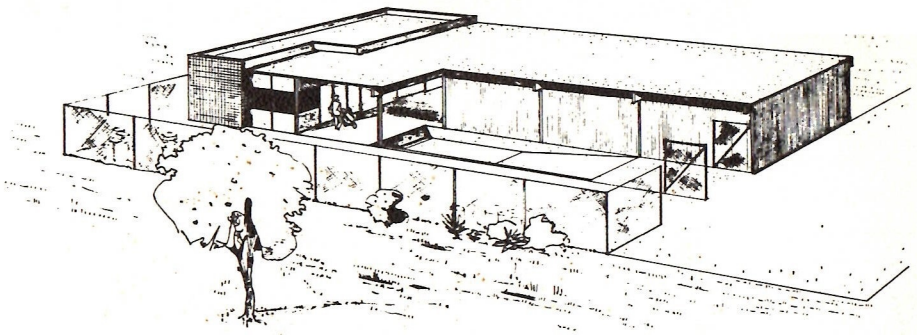
The report said product planning will enable all individuals concerned with the product planning process to use their creative abilities cooperatively to develop products in the best interest of Tektronix and its customers.

Product planning deals with (1) long-range planning topics and those concerned with external relations and (2) implementation. The first phase is considered by the Product Planning Strategy group, headed by Howard Vollum; the second phase by the Product Planning Implementation group headed by Bob Fitzgerald.

New appointments were announced by Tek's overseas operations. On January 1, Frank Doyle became European Marketing manager and will be initially involved in establishing Tektronix' new marketing operation in Guernsey. He will deal with distributors, handle and ship their orders for instruments and spares, and conduct technical liaison between Tek's European customers, Tektronix, Inc. and the European field engineering operation. Frank will work closely with Byron Broms.

Walt Morrison became Personnel manager of Tektronix Guernsey Ltd. at the end of November. He replaces Dave Spinks, who will transfer to Tek's Beaverton Personnel department this spring.

State legislators toured Tektronix during November as part of the local Chamber of Commerce "Legislators Research Day." The visitors toured CRT, Ceramics, Metals and Assembly buildings and lunched with Tektronix managers.



PLANS for the Chemical Storage building were recently approved by the board of directors. Construction will begin March 1 for the $33,000 building. It will contain 45,000 square feet of floor space with steel wall panels, masonry blocks and a flat build-up wood-frame roof. Facilities will include bulk chemical storage area, separate chemical dispensing room and offices. Truck loading facilities and a 2500-square-foot fenced storage yard will adjoin the building. It is the first building designed by Ray Cone's Facilities Design group, and will be situated east of the present CRT building.

Winter travel has been brisk between Tek's Beaverton headquarters and the European operations as Tek managers met to discuss plans and policies.

Don Alvey, European operations manager, spent four weeks in Beaverton, conferring with the Management Group and International committee on ways to improve our service to overseas distributors and customers. Don also discussed the effects of the 1962 US tax legislation. He returns in February to discuss Beaverton and European manufacturing relationships.

Also in Beaverton was Arthur Ball, Tek Guernsey's Customer Services manager, who observed the C/S operations here in an effort to tighten liaison between the two offices.

Other European visitors are Roy Falla, Special Projects engineer from Guernsey, and Jim Beijersbergen, Test & Transformers unit manager from Heerenveen. Roy and Jim are presently with Instrument Manufacturing.

Beaverton employees visiting Europe were Controller Al Swanson, and King Handley, Materials Management manager.

Al attended the Tekintag shareholders' meeting in Zurich, Switzerland in November, where he cast the Tektronix, Inc. votes.

He met with Accounting personnel in Guernsey and Heerenveen to establish working relationships and promote understanding and confidence.

King visited Guernsey and Heerenveen in December to obtain information on the European manufacturing plants, including equipment, facilities and production capabilities.

Howard Vollum was appointed in December to the 15-member board of trustees for the proposed graduate study and research center in Portland by Governor Mark Hatfield. The center would be set up with the cooperation of institutions of higher learning and Portland-area businesses. Tektronix has advocated such a center for scientists and engineers.

The board of directors and the Management Group approved final plans in January for the new $988,000 Electrochemical building. Cost includes landscaping, capital equipment, parking lot and chemical waste disposal. The structure, to be situated east of the CRT building, will contain all necessary facilities for Tek's total engineering, development and production requirements in electrochemistry—plating etched circuits, chemical milling, anodizing, panels and tags. Floor space, 32,000 square feet, will include offices, laboratories and lunch room on the second floor and production facilities on the first floor. Tentative completion date is set for October 1963.

Bob Fitzgerald, vice-president, operations, appointed Mike Park Manufacturing manager and Byron Broms Marketing manager.

Mike, Instrument Manufacturing manager the past two years, will administer all manufacturing activities — Instrument Manufacturing, CRT, Fabrication & Molding, Material Management and Quality Assurance. Replacing Mike as IM manager is Ken Spooner, former Plant 3 manager.

Reporting to Mike are Bill Walker, Manufacturing Staff Engineering (MSE) manager; Ross Porter. Manufacturing Planning manager, and Otto Zach, Manufacturing Administrative Support; "Ash" Ashenbrenner, F & M; Frank Kopra, Quality Assurance; King Handley, Materials Management; and Derrol Pennington, CRT.

Mike announced that his Manufacturing team will provide a framework for correlating manufacturing tasks and services to Marketing and Engineering.

Byron Broms, former Corporate Marketing consultant, will unify Tek's domestic, export and corporate marketing functions in his new role as Marketing manager. Byron is responsible for Tek marketing activities in all geographic locations, including functional responsibility for European marketing — marketing agreements, location of field operations and general pricing and marketing policy.