tek talk

The Tektronix Employees Magazine

Spring 1967

The Tektronix Employees Magazine **Spring 1967**

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Tek Talk will be sent regularly to persons outside Tektronix who request it.

TELEQUIPMENT

If tempted to call Telequipment Ltd. "the British Tektronix," don't.

Because, for each similarity between Tek and our new London-based manufacturing subsidiary, there is also a difference.

Newspapers describing the acquisition called Telequipment "a small British company." That's correct: It employs only 300 people. Yet, it's equally correct to note that it makes more oscilloscopes than any United Kingdom manufacturer.

Like Tek, it earned its reputation by specializing in 'scopes—something that's true of no other British company, and probably none in the US.

Also like Tek, it has a staff of factory-trained field engineers—nine in the UK. Unlike us, however, it has no marketing subsidiaries, but sells its products, in 32 countries, through distributors.

International sales account for a large part of both companies' business. Tektronix' percentage—about 30 per cent of total sales—is exceeded by Telequipment's 45 to 50 per cent, mostly to the US, Canada and Australia.

Whereas we make a great many of our components, Telequipment makes only a few, mostly probes and small metal parts, and designs its own CRTs, cameras and scope trolleys (Scopemobiles, to us).

Telequipment instruments are in a price and performance range not covered by Tektronix oscilloscopes. Their scopes range from $70 up, their CRTs

UNLIMITED??

from about $8 up; Tek scopes from $500, our CRTs from $40. The top Telequipment oscilloscope costs about $700; ours, about $5000.

Yet, within this low-price range, says Managing Director Bob Groom, Telequipment has advanced the state of the art, as Tektronix has.

Bob is one of three men who founded the company in January 1952; that November, when it incorporated, he was one of the three directors. The others were Jim Copps, now in charge of Test-QC, and Jack Coomber, now in charge of production and personnel.

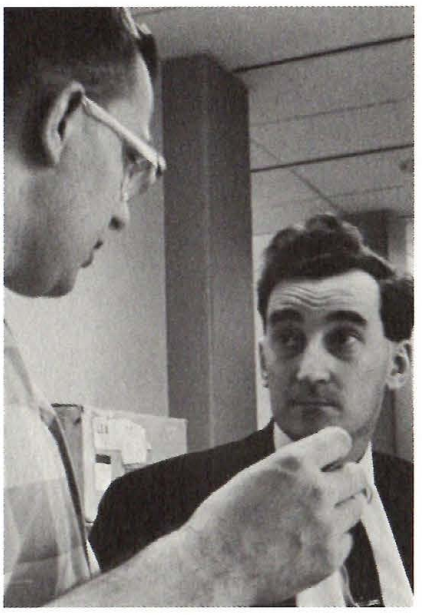
In 1956, Frank Beckwith, executive of a large publishing company, who had been handling Telequipment's money matters on the side for several years, left the book business to become the fourth director.

The first products were pattern generators for TV servicemen and test-picture-generating equipment for TV factory installations. But a more interesting, wide-open market soon appeared:

No one, they felt, was producing a reliable low-priced oscilloscope. Two major British companies and a couple lesser ones were making large laboratory scopes. The closest thing to the market Telequipment envisioned was a fairly small scope just introduced by a US company that called itself Tektronix.

Telequipment's first scope, a 6 MHz bandwidth portable with triggered sweep generator, was introduced in 1954. No other British instrument

MANAGING DIRECTOR Bob Groom of Telequipment Ltd. listens intently as Tek's Larry Simpson (3D CRT Engineering) describes experimental work being done in cathode-ray-tube design. Telequipment, like Tektronix, has earned its reputation through attention to technical excellence and customer value.



offered that sort of performance, Bob recalls; it was an instant success. Reminiscent, in fact, of the introduction of the Tektronix 511 in 1947.

Although held back in the early days by lack of finances, the company grew steadily and introduced new models each year.

Its first home was about as humble-sounding as you could ask: A small wooden hut at Harringay, in north London. Early days were hectic; one director would be out selling a scope, another bargaining for components, a third putting the next instrument together.

A minor historic date was the day they drowned the company records.

The hut, very hot in summers, could be cooled only by keeping the roofing felt doused with water. One of the directors, taking his turn at dousing duty one day, spilled the water bucket into a cardboard box—the company's "archives." It was days before they had dry records again.

They moved to a bigger building, an ex-laundry at nearby Whetstone. There the atmosphere remained informal; the work routine, unpredictable. Assembly operations frequently jerked to a halt while the production staff (who owned the neighborhood's only fire extinguisher) rushed to quell a blaze in a motorcycle factory across the street, where things ignited fairly often.

The company eventually moved to its present location in London's Southgate area, added to it, is now building a new structure and negotiating for still another site.

Telequipment today makes 13 scope models and six plug-ins, and has a direct-labor force of about 200—mostly women, like Tek. Its engineering and development staff totals nine; its marketing staff, 12.

It offers the largest scope line of any British manufacturer. It ranges from a simple audio-frequency instrument for schools (costing just over $50) to an oscilloscope with vertical amplifier plug-in, signal and sweep delay and a dual-beam mesh-type CRT.

Schools, incidentally, are the largest customer, with about 25 per cent of company sales. The rest are shared by industry, government agencies and the Post Office. (As in most nations, the post office in the UK controls not only mail but also all telecommunications.)

In the low-priced oscilloscope range, Telequipment has amassed an impressive history:

Its first scope, sold in 1954 to the Post Office, was followed by smaller portables, and the fame of the company's trade mark, "Serviscope," spread.

The first Serviscope, aimed at radio and TV, was so successful that it continued in production with virtually no changes until 1957. In '58, its face was lifted to appeal to American buyers.

That year, Telequipment produced the first dual-beam oscilloscope manufactured in commercial quantities, and its first rackmount instrument. It brought out a plug-in-type scope in 1960, the same year that saw the beginning of a Telequipment sales force.

In the early '60s, the company, to meet some needs of the education field, introduced the model S61. It has a five-inch CRT; its case is only 7 x 8 x 15 inches. An even smaller instrument —and one with more limited use—is the Serviscope Minor, which costs about $50. Designed for secondary-school physics instruction, it also has found uses in radio servicing, hi-fi and recording. It is 5 x 6 x 9 inches, simple to operate, with a 2½-inch CRT and 30-KHz bandwidth.

In 1965, Telequipment introduced the world's first dual-beam rectangular cathode-ray tube.

And, keeping abreast of the latest advances in scope technology, the company has recently built a prototype of a low-cost storage CRT.

Now that the two oscilloscope makers are one, what will the future bring?

One pretty safe guess is that there will be compatibility of philosophy. Bob notes strong parallels in the two companies' attitudes toward people as well as products; in their approach to both design and marketing problems; and in their insistence on reliability, dedication to customer value and strong belief in the importance of sound employee relations.

Specifically, he says, Telequipment hopes it will realize these benefits from the joining of forces:

Wider markets; increased export sales, particularly in the US; access to years of Tektronix technological knowhow; and financial help, for expansion to meet the growing demand caused by Telequipment's hard-earned reputation.

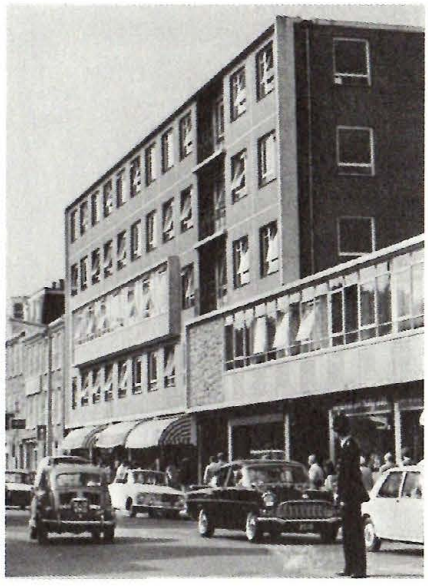
For Tektronix, the advantages include the ability to "round out the bottom of our product line"—which means far more than it might sound.

"It's not just a matter of adding a new instrument line and thereby making a few bucks," points out Don Alvey, International Marketing manager. What we've acquired is a low-priced product we can proudly offer to customers in many of the world's undeveloped markets—countries that lack not only the funds but also the technological need for sophisticated Tektronix instruments.

"For every Tek scope buyer in those areas, you'll find at least three potential Telequipment customers," Don believes.

And, once we've placed a reliable low-priced scope in the hands of the user, he has become a Tektronix customer—one we'd hope to keep in the future as his instrument requirements become increasingly sophisticated.

Otherwise we'd have to win that customer away from another company —a time-consuming and costly effort. Even more costly would be to develop and produce, on our own, a line of low-priced instruments, such as we have now obtained with the addition of this energetic and inventive British company.



ONE WORLD, ONE MARKET

Increasingly, more and more US companies are making inroads into the vast market potential that lies abroad.

Most of the foreign expansion for American business has been in Western Europe, where efficient new factories—many of them financed largely by US aid—have restored the countries to their pre-war positions among the industrial leaders of the world.

The idea of economic unity emerged as a powerful force in Europe after World War II. The US favored and encouraged this European integration, believing it would provide a strong ally against the Communist Bloc; and that an integrated Europe, free from the political tensions which caused two world wars, would be able to bear a greater share of the Free World's economic burdens.

The United States began pouring billions of dollars of aid into Europe after World War II through the Marshall Plan and other reconstruction aid programs, to help create a healthier Europe. The improved economy, in turn, opened up vast markets, explored by world business during this decade.

Most American business, however, has established overseas manufacturing facilities reluctantly; and only when it became impossible to maintain the business through exports.

Jack N. Behrman, assistant secretary of commerce for domestic and international business from 1962 to 1964:

"The available evidence suggests that American manufacturers try to hold on to foreign markets by exporting to

MOVEMENT OF PERSONNEL between Beaverton and overseas has typified Tektronix' International operations. When the photo above was taken, Frank Doyle (left) was manager of Tektronix Limited, on Guernsey. Also pictured are Arthur Ball (center), then Customer Service manager and Peter Fulwell, accountant. Frank is now serving in Beaverton with International Marketing; Arthur is Tek UK manager. At right, Vice-President Bob Fitzgerald pauses during one of his frequent trips to Tek facilities abroad, to talk with Harold Guilbert (center), Components manager, and John Tongs (right), then Capacitors manager, of Tektronix Guernsey Limited.

them for as long as possible. Few enjoy the risks of the high initial cost of establishing operations abroad.

"When the manufacturer decides to move abroad, it is usually because changes in relative costs, political conditions, foreign exchange controls or import quotas, among other things, make it impossible for him to continue to service his overseas markets through exports."

The international segment of the average US company accounts for about five per cent of total sales; Tektronix' is about 30 per cent.

Tektronix "went overseas" without the intent of building an international company. The market was probed to preserve already existing markets, and to increase business.

It was inevitable, however, that Tektronix become an international company: Its reputation of quality and service spread throughout Europe after the first instrument was marketed in Sweden in 1948.

Tektronix moved through an evolutionary process typical of most companies that enter world markets: It began serving the domestic customers, ventured into the international field by responding to demands from overseas, moved forward through a positive export program and finally found it necessary to establish its own foreign operations.

And so, today, Tektronix thinks as an international company: Management decisions are made on the basis of the oscilloscope market as **one** entity, not on the basis of a domestic market and a foreign market.

Tektronix' growth in foreign markets has been steadily climbing; sales overseas have increased more than 250 per cent in less than a decade: From $8,500,000, about 20 per cent of total sales, in the 1959-60 fiscal year to $30,100,000, nearly 30 per cent of total sales, in the 1965-66 fiscal year.

Foreign operations have also contributed to the growth of Tektronix in Beaverton itself: Exports increased from $8,000,000 in the 1959-60 fiscal year to $20,500,000 in the 1965-66 fiscal year, including exports to Tektronix' subsidiaries overseas.

And since profit-share is distributed from operating profits around the world, it is significant to note that in the 1963-64 fiscal year—when domestic sales showed in increase of only one per cent over the preceding year—international sales increased 25 per cent.

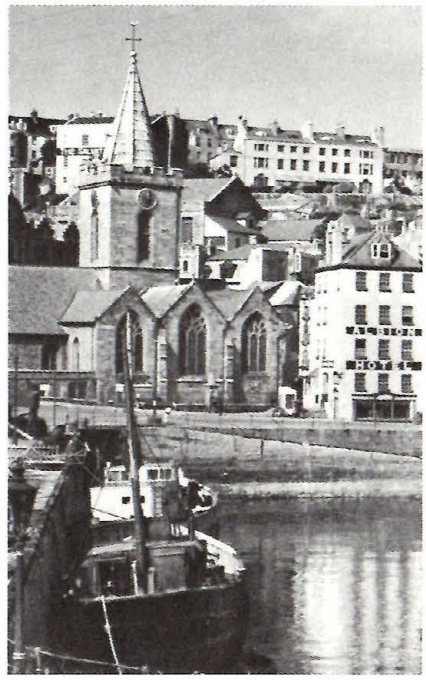
Mr. Behrman: "Besides stimulating exports, foreign investment contributes significantly to a positive payments balance by repatriation of earnings. From 1950 through 1963, repatriated earnings exceeded net new direct foreign investment by over $12 billion.

"There are two principal reasons for those favorable returns: Foreign investments have been profitable and over half of these earnings in the developed countries have been returned to the parent."

At the end of the 1965-66 fiscal year, Tektronix' investments outside the United States were about $12.6 million; sales in foreign markets that year exceeded $30 million.

As economic conditions improved in Europe during the late 1950's, the outlook for continued sales growth in that market looked bright. The ability of Tektronix to offer European customers competitively priced instruments, however, was being hindered by import duties. This problem became more and more crucial as competitive instruments started appearing in England, a major overseas market for Tektronix.

Another factor was also changing the situation: Following many discussions and negotiations, the **idea** of economic unity in Europe was becoming more than just an idea: It was being translated into action with the formation of the European Economic Community (EEC) in 1958 and the European Free Trade Association (EFTA) in 1960.



The aim of both economic communities was to decrease tariffs among members.

President Howard Vollum: "The combination of tariff and competitive problems led to the conclusion that the best way to meet the situation was to set up manufacturing subsidiaries in the European Economic Community and the United Kingdom."

So, the principal reason for manufacture overseas was to supply overseas customers with instruments at a more competitive price.

"In other words," says Earl Wantland, International Manufacturing man-

ager, "compete on equal terms with overseas competitors."

And this could be done only by moving the Manufacturing operation inside the "tariff wall," to avoid import duties that would result in higher-priced instruments.

So, in 1959, Tektronix established a manufacturing plant on the English Channel island of Guernsey to serve the United Kingdom. The EFTA community was formed the following year, and now the plant serves all the EFTA countries: The United Kingdom, Sweden, Denmark, Switzerland, Austria, Portugal and Norway; and Finland, an associate member since May 1961.

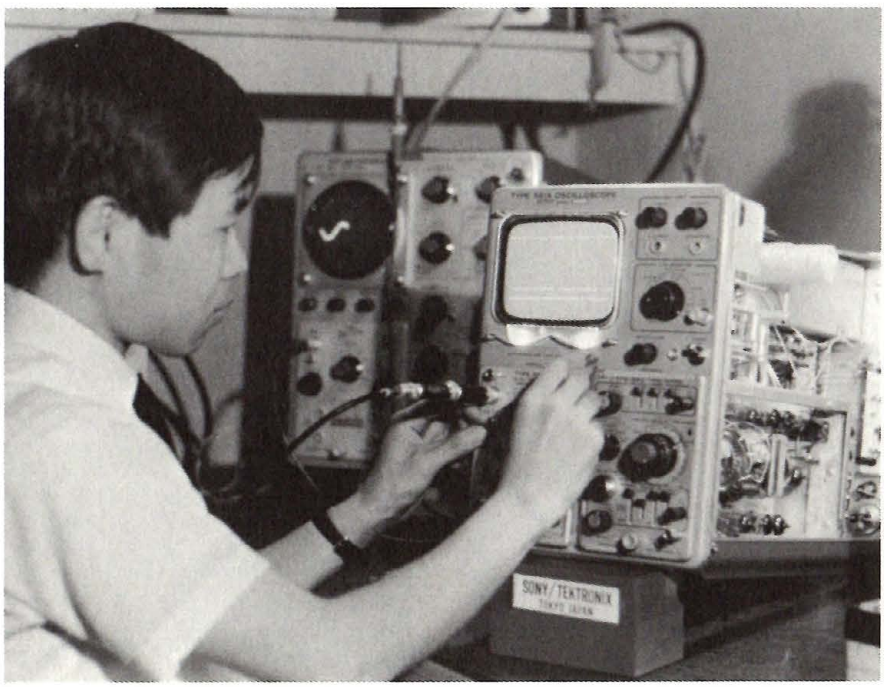
A second manufacturing facility was established at Heerenveen in The Netherlands in 1961 to serve the EEC countries (generally known as the Common Market): West Germany, France, Italy, Belgium, The Netherlands and Luxembourg.

EFTA has a program in which the member countries agree to gradually eliminate trade barriers among themselves. The Common Market has an even farther-reaching plan: It aims at establishing a supra-national economic union by harmonizing the members' policies of internal and external trade, the capital and labor markets, transportation and agriculture.

The EFTA agreements, in existence about seven years, enable Tektronix Guernsey instruments to be shipped to member countries duty-free. At least 50 per cent of the invoiced value on the instruments, however, must be derived from EFTA sources. By contrast, instruments shipped directly from Beaverton to serve the EFTA community carry import duties ranging from 2 to 25 per cent.

The Common Market is fast approaching its principal goal of a common outer tariff and a zero internal tariff; the goal should be reached late this year. At present, import duties from outside the Common Market vary from 15 to 20 per cent. Because of the reduced tariffs within the Common Market, Tektronix Holland N.V. in Heerenveen is serving the customers in that economic community by providing competitively priced instruments.

Changes were also occurring in the Orient, where the post-war Japanese government took a very aggressive role in developing Japan's economic strength by protecting its own manufacturers through imposing high import duties and placing strict controls on foreign-exchange funds. Potential customers of Tektronix found it extremely difficult to obtain foreign-exchange funds with which to buy our instruments; and competitors were appearing in the country.



So, in 1965, manufacturing operations began in Japan with the formation of Sony/Tektronix Corporation, jointly owned with Sony Corporation, well-known Japanese electronics firm. The corporation, which has its own engineering capability, was formed to build and sell Tek scopes in the Orient, develop a complementary line of instrumentation, and compete with Japanese manufacturers on their home ground.

Tektronix now has more than 800 employees in overseas manufacturing and marketing offices, less than one-half of one per cent sent from Beaverton. In addition, Tektronix has distributors and representatives in 36 countries, complementing the company's five marketing subsidiaries.

To expand and improve marketing activities in Europe, the first marketing subsidiary—Tektronix International A. G. in Zug, Switzerland—was established in March 1961. Others followed in 1963; Tektronix Limited in Guernsey (not to be confused with the manufacturing operation in Guernsey), Tektronix UK Limited in Harpenden, Tektronix Canada Limited in Montreal and Tektronix Australia Pty. Limited in Sydney.

Marketing supervision in Europe is handled through Tektronix Limited, which provides a central point for order processing, warehousing of Beaverton-made products, answering technical queries, distributing literature and shipping Beaverton-made instruments. Prior to the establishment of Tektronix Limited, marketing was handled from Zug and warehousing was about 600 miles away in Heerenveen. The Asian and Latin American markets are served through region export managers in Beaverton.

Tektronix has been successful as an international company partly because of its willingness to make long-term investments overseas, providing manufacturing and marketing facilities; and to support these facilities with technically trained personnel.

Distributors and customers participate in training sessions at Guernsey or in Beaverton; training is also provided in the field.

Tektronix Limited is the training center for Europe, providing courses in Guernsey and seminars throughout Europe. Four courses in Guernsey each year, lasting for about two weeks each, are geared mainly for customers; about 200 of them participate in the sessions every year. Special courses—some of them lasting up to six months—are given on demand, geared mainly for Tektronix' field people and distributors. In addition, the Training department of Tektronix Limited holds seminars in

Norway, Sweden, Germany, Israel, South Africa. . . . .

Frank Doyle, International Operations: "Seminars are becoming increasingly popular because it is much easier for many people to attend sessions in their own countries. Greater emphasis will undoubtedly be placed in this area of training in the future."

Continued international growth for Tektronix, and other US companies, is dependent on economic progress and political security around the world.

World trade tends to create economic stability by the exchange of dollar resources between one country and another.

Ladd Goodman, International Administration: "But, for world trade to succeed, the trading partners must be generally equal in their ability to pro-

duce, to make investments, to buy and sell."

The potential markets of today and tomorrow, many of them still untapped, lie in the poor countries—where two-thirds of the people of the world live. The wealth of the world cannot be significantly increased — or the living standards of its people raised—if these markets are ignored; and the developing nations cannot contribute fully to world trade unless they can become equal trading partners: A rich country cannot sell to a poor country, because it is not in a position to buy.

So, trade cannot grow without aid. The United States spends billions of dollars annually to help developing nations. And the United Nations, working through its Economic and Social Council, also strives to promote higher standards of living, full employment and conditions of economic and social progress and development—essential elements in creating equal trading partners, and in opening up additional markets in the untapped areas of the world.

Yet, in spite of massive development aid since the close of World War II, the average per capita income (calculated on the basis of gross national product) of two-thirds of the people of the world is $85 a year; their incomes grow only about $2 every year.

In contrast, the per capita income for 1.2 billion people in the middle income and rich countries is $1750 per year. And in the richest among them, the United States, the per capita income in 1965 was $3500; that income over the past two years has grown at the average rate of $232 a year.

The US **increase** itself is nearly three times greater than the average per capita income of the people in the developing countries.

B. K. Nehru, India's ambassador to the United States, speaking last November to the National Foreign Trade Convention, predicted:

"If these trends continue, the situation at the end of the century will be that per capita incomes in the richest and in the poorest countries will be $4500 and $170 respectively.

"The process of tearing the world asunder into two parts will by then have gone so far as to make any kind of meaningful relationship among them a virtual impossibility."

To assist developing countries to become stronger trading partners, he recommended greater aid, more investments from the private sector and more favorable tariff structures that would enable developing countries to trade with industrialized countries.

George D. Woods, president of the World Bank: ". . . It is a matter of high irony that development, instead of proceeding at the faster pace of which it undoubtedly is capable, is threatened by a serious loss of momentum. The effort is faced by a crucial finance gap—the difference between the capital available and the capacity of the developing countries to use increasing amounts of capital effectively and productively."

The combined annual national income of the developed countries who are members of the Organization for Economic Cooperation and Development **increased** by $250 billion during the past five years. The aid level, however, has remained static at about $6 billion a year, slightly more than half of the amount adopted by the developed countries as the target for aid in the United Nations Decade of Development (1960-70). And the expansion in world trade has largely bypassed the developing countries.

Economic progress, or lack of it, impinges on political stability. The clash between the rich and the poor, to integrate, has been peaceful in some nations, violent in others. A collision between the haves and the have-nots on an international level could be disastrous.

Mr. Nehru: "This is so hopeless a conclusion that even the kind of short-sighted and non-rational world in which we live will not, I trust, allow it to come to pass."

EXPORT'S EXPERTS

RESPONSIBILITY FOR DIRECTING Tektronix' export activities at Beaverton is shared by Dick Zahn (left) and Lew Kasch, regional export managers. Customers in a large percentage of countries do business with Tektronix through direct contact with Export personnel.

Tektronix oscilloscopes in Ethiopia? Yes—and in almost every country of the free world from Aden to Zambia.

Most of Europe is served by Tektronix, Ltd. in Guernsey with the help of local distributors. Tektronix subsidiaries serve the U.K., Switzerland, Australia and Canada. The present world-wide political climate makes sales activity in Iron Curtain countries impractical, but we hope to see this situation improve eventually.

The rest of the world outside the United States is served directly from Beaverton. Sony/Tektronix, our new joint venture in Japan, receives marketing and technical assistance from Beaverton now, but after this formative stage they'll operate independently.

Customers in an average of 70 countries each year do business directly with Beaverton; we have distributors in only 13 of these countries. This means that customers in the other 57 countries must negotiate the selection, purchase, application and maintenance of highly sophisticated electronics equipment from distances in the thousands of miles.

Chiefly through correspondence with our export people, these customers must overcome hazards of overseas transportation, sometimes sketchy communication facilities, and government red tape that would appall the most hardened bureaucrat. After all this, they pay import duty ranging as high in some countries for some Tektronix items as 220 per cent of the value of the goods.

Yet they continue to order from Tektronix—not only because of the excellence of the product, but also because we offer the services of a highly competent export organization to help cut the red tape, minimize shipping hazards and reduce expenses by knowledgable handling of shipment and documentation.

Our export people provide interface between overseas customers and all areas of Tektronix whose services these customers use—Manufacturing, Freight Traffic, Export Shipping, Domestic Marketing and Accounting; in fact, almost every part of Tektronix. The Beaverton export group is divided into two sections: International Marketing, responsible for making contact, maintaining communications and providing technical support to customers and distributors; and Export Order Administration, responsible for processing orders, making shipments and supplying inputs to Accounting for billing.

In countries where the volume of Tektronix business justifies it, we establish distributors. They offer our customers technical and commercial services, backed up with first-hand knowledge of the local language and conditions. As business grows in an area, we look to the establishment of additional distributors, or even of Tektronix subsidiaries. At some Utopian time, customers anywhere in the world may be able to pick up the phone and talk to a local Tektronix field engineer.

Language differences are no barrier to communication with our customers. People who use oscilloscopes are, understandably, well-educated; the fluent English used by many of our customers would put native-born Americans to shame. Linguists in the export group can translate most commonly used languages. Employees in other areas of Tektronix volunteer their translating services for other languages.

When a customer's inquiry comes to Beaverton, International Marketing people respond; sometimes by referring it to the customer's distributor, sometimes by direct mailing of catalogs and specification sheets, sometimes by sending a quotation. Often, they help the customer determine what instruments are needed for his measurement problem and what accessories and auxiliary instruments he might find useful.

Quotations are made on pro forma invoices (forms as nearly identical as possible to actual invoices), which also serve as supporting documentation when the customer places an order. In many countries, customers must submit pro forma invoices with applications for import license, foreign exchange permit, or any other import formality required by their government. Overseas banks often need pro forma invoices when they arrange financing for an order.

In many countries, wording and itemized prices on import documents will be identical with the information on the pro forma invoice. The actual invoices, both the ones accompanying shipments and those submitted for payment, must then agree in every detail. Thus, a mistake on the pro forma invoice could mean endless complications of obtaining new permits; a mistake undiscovered before shipment could mean documentation errors resulting in fines against the customer, or even confiscation of the shipment at customs.

Used as a quotation, the pro forma invoice helps us show customers appropriate selections of instruments, comparisons of shipping methods, and ways to save money. We issue alternate quotations against a single inquiry when comparisons would be useful to the customer.

When recommending a shipping method, we consider the customer's lo-

cation in relation to his nearest airport or seaport; available transport to that port; U.S. port facilities from which shipment will be most practical; cost of special packing, when required for a shipping method; insurance costs, which vary with shipping method and destination. The items to be shipped make a difference—we've had requests for quotations on shipment of full-size oscilloscopes by parcel post! Economy-minded customers sometimes request all shipments by surface, not realizing that air shipment of small instruments often costs less.

Just as many U.S. residents don't realize the distance between Bombay and New Delhi, many overseas customers don't realize that a distance of some 3000 miles in space and some two weeks in time by surface shipment exists between our Beaverton plant and any East Coast port. Customers who have routed shipments via New York for decades haven't all discovered that West Coast shipping facilities have grown to meet the needs of West Coast industry. Part of our job in saving the customers' dollars is to demonstrate on quotations the saving in shipping costs when we can ship directly from Portland.

Sometimes it's necessary to ship on a vessel carrying a national flag that isn't available on the West Coast, or to ship to a port served only from the East Coast. Then we quote extra charges for inland freight and forwarding fees, or the customer may not have enough foreign exchange to cover the shipment.

Export quotations are valid for 90 days—three times longer than domestic quotations—to allow for complexities of international commerce.

International Marketing people screen incoming orders for unusual terms and conditions, technical problems and anything else that could require negotiation before processing an order. Seemingly minor details can cause delays. For instance, if the customer doesn't state his line-voltage requirements, the factory order can't be entered. Many instruments for export require modifications for overseas voltage and frequency; our newest instruments have switchable transformers that eliminate this problem.

Neglect of any detail can have far-reaching consequences. Several years ago, someone forgot to confirm that the customer had a valid import license. The shipment went out, and our cartons sat on the overseas dock for five years, accumulating various charges. Because of customs regulations in that country, the customer couldn't get his instruments and we couldn't get them back. Through persistent unravelling of red tape, we finally made delivery, and collected our money, too. One such incident in all the years we've been exporting is a fair average—and a good object lesson for new export employees.

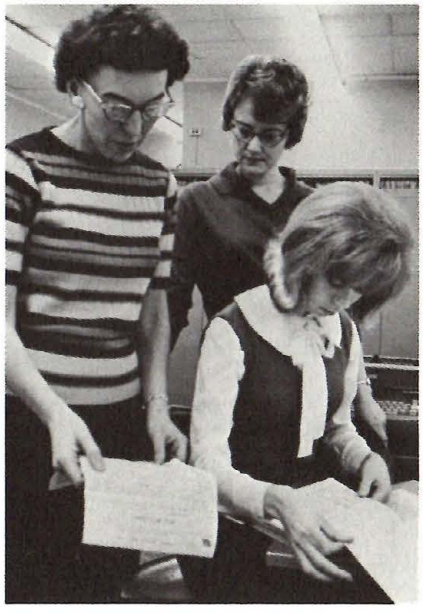
After the International Marketing screening, the order goes to Export Order Administration, where it is carefully reviewed. Specialists in shipment to the destination country check out all requirements, enter the factory order, obtain approval of terms from the Credit department when necessary, and apply for validated export license if required.

Export licensing is a subject worthy of a whole book—in fact, it is the subject of some very fat, impressive books. Our export people have to maintain intimate acquaintance with all the latest government regulations.

All commodities are classified by the US government for statistical and export-control purposes. Most Tektronix products are in highly controlled commodity groups requiring validated export license for shipment to most destinations. We must apply to the Office of Export Control in Washington D.C. for such licenses, and supplying supporting documents with our applications. Less-controlled items can be shipped under several types of general license, determined by the nature of the item, the dollar value within the commodity group to be included on one shipment, and the degree of control applicable to the destination country. Individual license applications aren't required for shipment under general license.

We have few problems concerning export licenses, largely because of our sound relationship with the Bureau of International Commerce and U.S. Customs Service. The Portland field office of the Department of Commerce has its own staff of export experts, whose advice contributes substantially to the success of our export program.

When the instruments are ready, the special packing and marking done, the licenses in order and all documents prepared, the cargo can be delivered to the dock or airport. Cargo must be accompanied by a shipper's letter of instructions, telling the carrier exactly how to handle the shipment. Export declarations must be validated by U.S.



Customs before a shipment can be loaded on an international carrier.

Each of the many steps in processing an export shipment serves some purpose. For example, elaborate and sometimes colorful shipper's marks must appear on every package and on all documents relating to the shipment. In countries where most working people can't read, the dock hands can learn that cartons with purple diagonal bars on each corner, green stripes around the middle and a yellow circle on each side belong to one importer. The marks also contain written information to help the carrier and customs people identify shipments.

In many countries, pilferage around docks and airports is the importer's nightmare. Once, thieves got loose in the hold of a vessel carrying one of our shipments. They didn't realize that the strange thing made of knobs and wires had any value, but wood was scarce in their country. So they stole the boxes and left the instruments.

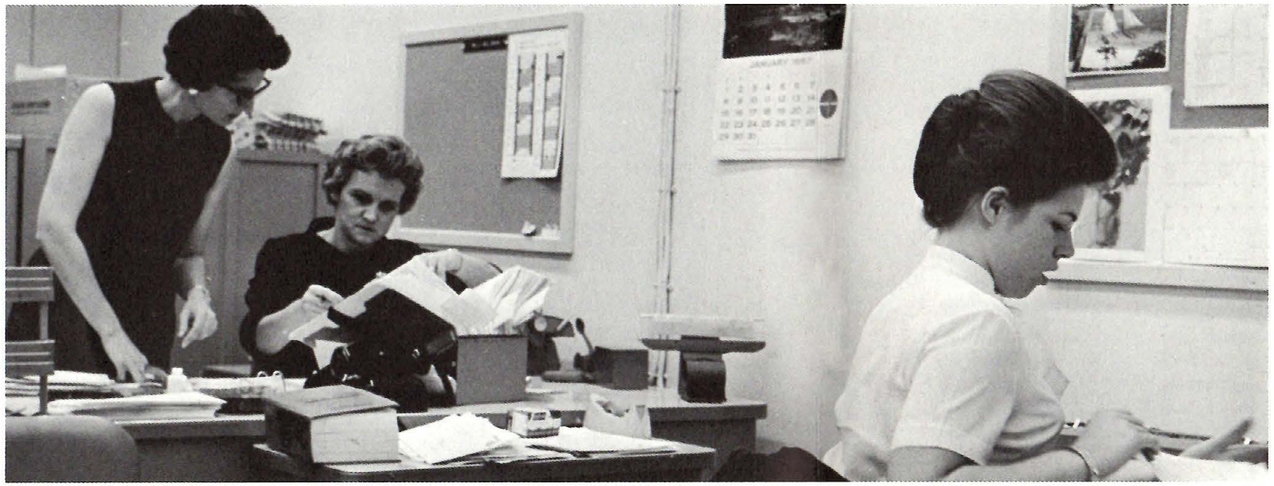
Because Tektronix packages have relatively big value and small size (two men could lift almost any box we'd ever ship), they're usually carried in special stowage—sometimes even in the captain's cabin. We aren't often troubled with pilferage.

Hostilities between countries create problems for exporters. During one of the recent feuds between neighboring countries, customs officials in one would confiscate all cargo destined for the other. So we had to use some caution in routing shipments.

Internal problems as well as outside strife can unsettle the commercial picture in a country. Political risk and availability of foreign exchange may affect the credit position of the most reliable customer and the most stable bank. We like to offer all our customers open account terms but, when circumstances make it necessary, we request better assurance of payment, such as a letter of credit.

Letters of credit originated in times when the wise traveler didn't carry valuables on his person. Instead, he put money in his bank, and they gave him a document (letter of credit) to present to a bank on the other end, along with proof of his right to use it. Then, the traveler got his money; the banks worked out their own means of transporting gold or made reciprocal transactions on paper.

When a customer opens a commercial letter of credit, his bank engages to



transfer his money to a supplier in exchange for proof of shipment and, usually, documents controlling ownership of the goods shipped. Presenting a bank collection demands exacting preparation of elaborate and sometimes archaic documents.

Consular invoices, often written on impressive forms, sometimes in foreign languages, are visaed by the consul of the customer's country and sealed with the consular seal—a gold sticker, or red wax with blue ribbons beneath, or perhaps with an embossed seal similar to that used by a notary public. Some countries no longer require consular documents; a gain in efficiency but a loss in an ancient and colorful custom. Export Order Administration obtains these and any other necessary documents—airbills, ocean bills of lading, special certificates, marine insurance certificates. Then Billing sends ordinary commercial invoices with the export documents to the bank for collection.

Like letters of credit, marine insurance certificates date back to the days of the sailing ships and often contain archaic wording and provisions. Yet the terms have been updated to encompass the latest conditions of jet flight. The earliest known marine insurance contract, written in Genoa on October 23, 1347, is easier to read than some of the more "modern" ones, circa 1700 and on.

Because of careful packing, routing and attention to every detail, Tektronix enjoys a low loss record and, therefore, favorable marine insurance rates. But sometimes our best efforts aren't enough —a vessel carrying our cargo sank

three years ago, and we're still unravelling the complications. It isn't the same as replacing a lost domestic shipment—the customers had to go through the whole routine of getting new permits; one of them still hasn't been able to get the permit, so we still can't replace the goods.

Here's one of the places where a good export operation pays dividends in customer goodwill. If our customer has trouble with freight damage, loss or pilferage, we help him organize documents for his insurance claim. If one or two crucial parts will put his instruments back into operation, the Tek "Scopedown" system comes to the rescue.

Whether replacing a freight-damaged item or supplying a warranty replacement part, Tek's export people do everything possible to see that the customer gets what he needs **now.** Sometimes new import permits must be obtained if the item has more than negligible value; in some countries, even if it will be sent at no charge. We supply the customer with the right documents to help him get the permits. When it's "all clear" to ship, we expedite all handling to speed his parcel to him.

Determining which part to supply, explaining how to make repairs and how to recalibrate an instrument can involve some exchange of correspondence. Our regional export managers, Dick Zahn and Lew Kasch, must help customers service instruments from thousands of miles' distance, using limited communication facilities—you can't phone a fellow on the other side of the world when he's just going to bed at the time we reach the office.

Dick and Lew keep up to date on overseas conditions through periodic trips to the field. They also call on customers and help with their technical problems, supplementing the continuing service of our distributors. In countries where we don't yet have distributors, Dick and Lew are the customer's only on-the-spot contact with Tektronix.

Put yourself in the customer's place. Imagine that you're a scientist with an exciting research project planned. You go through agonies getting your equipment budget through your own institution; after that (in the USA), it's a 1-2-3 affair of purchase order, shipment, billing. Overseas, your problems would just be beginning.

You get a pro forma invoice from the supplier, which takes time and negotiation. You present this and other documents to your government. In months, or even years, they approve your request for import permit and foreign exchange. If you're lucky, the rate of exchange doesn't fluctuate too wildly in the interim—the money you've budgeted is still worth enough dollars. If you can't get enough dollars, you go back and begin again.

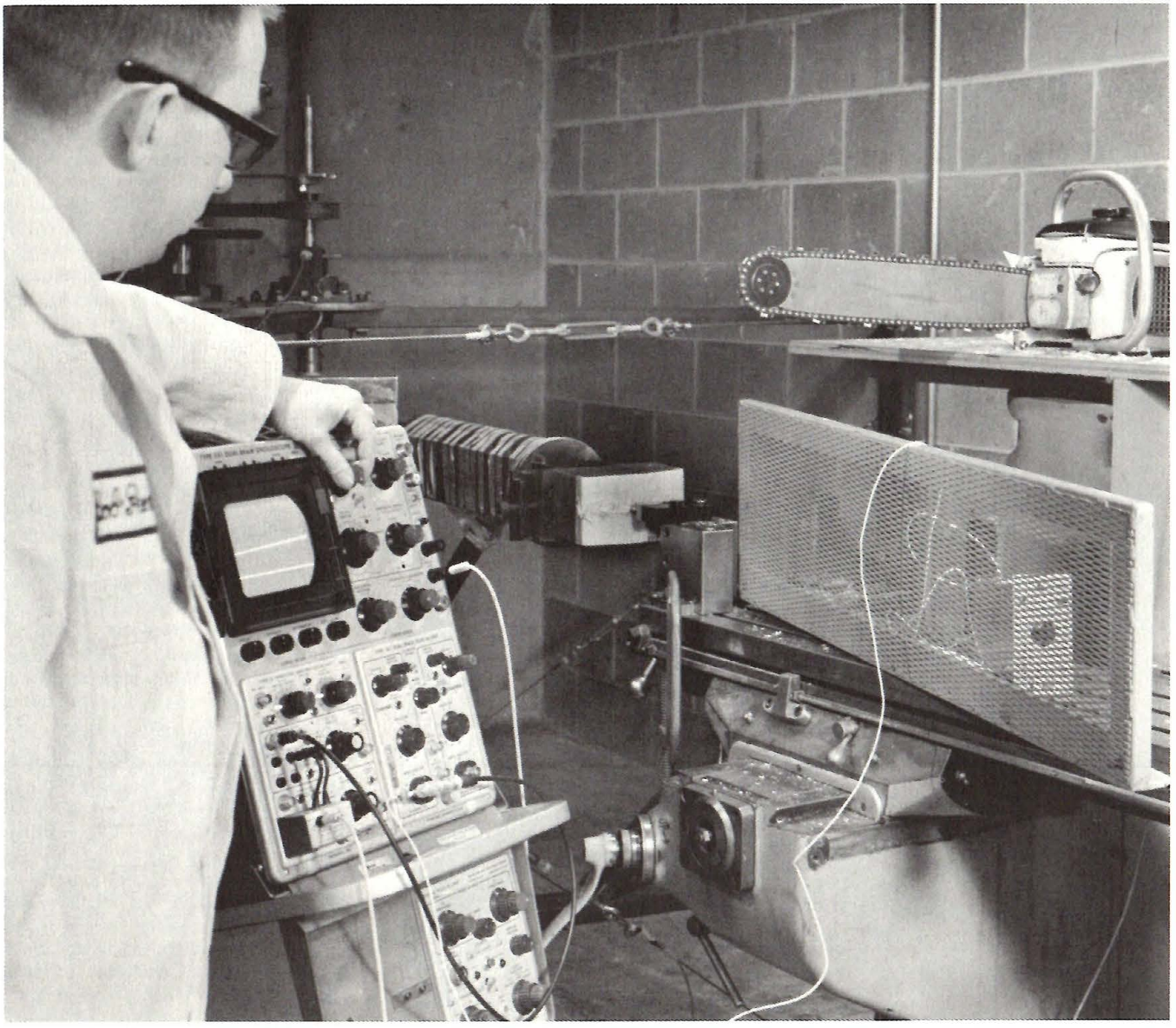
Finally, you've wrapped up the red tape and can place your order. Then the supplier takes anything from days to

months processing your order, building the instruments and preparing to ship them. Say your shipment is bulky and the budget doesn't run to enough foreign exchange for air freight. So the supplier waits a week or two, maybe a month, for an ocean vessel from his port calling at your port. (During the monsoon season in a big part of the world, most vessels stay clear of certain ports.) You wait several weeks for the vessel to arrive. Then there's the elaborate routine of clearing through customs and paying import duty. In a few countries, you might make a donation to some official's "favorite charity" to expedite clearance.

At last, your cartons reach your laboratory, you install the equipment and you're ready to start your work. If you're lucky, the dock hands didn't bounce the carton on its corner, and nobody has managed to extract any of the accessories. If one of the many possible catastrophes has happened, you shoot off a fast wire to the supplier. If he's a reasonably good supplier, you'll get what you need in less than six months. And—if you haven't lost all interest in your project—you've won the game.

Export has become a little more streamlined in some older industrial areas, but this is a reasonably accurate picture of the customer served by the Beaverton export people. Obstacles and complications only add spice to the job, according to these capable individuals; they feel that their work is the most exciting and rewarding in the world. Tektronix' customers, in Hoboken or Honduras, deserve the best technical and commercial service; Tek's export experts are meeting that challenge.

THE UBIQUITOUS OSCILLOSCOPE



SEE JOHN TALK

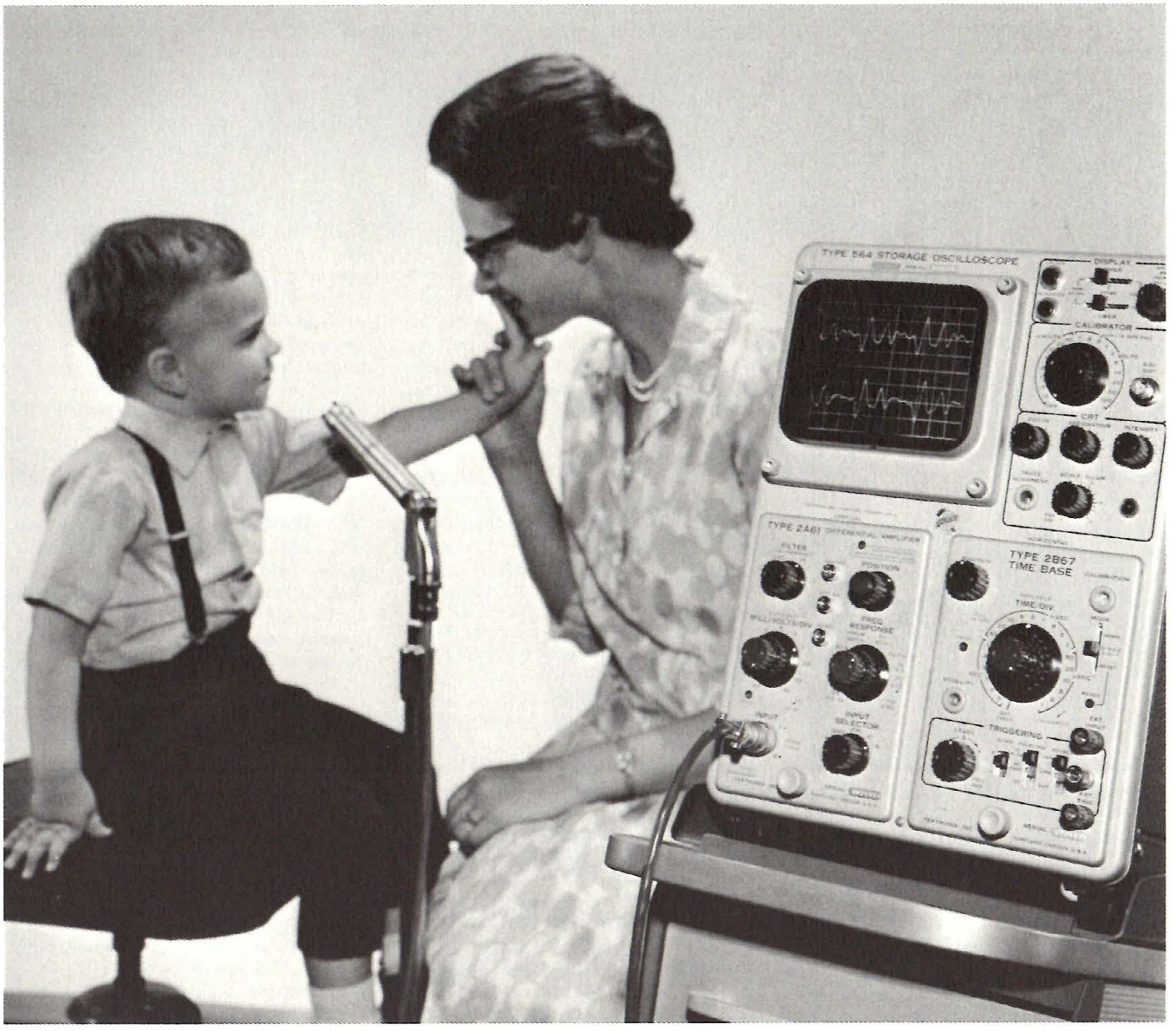
Words come hard to the child who cannot hear; unlike us, he has no pattern to copy. But, at Tucker-Maxon Oral School in Portland, a Tektronix 564 storage oscilloscope provides that pattern.

Here, profoundly deaf children from 3-1/2 years up are learning to form sounds and phrases by matching their voice "pictures" with those of the teacher—using the 564's capability to store two waveforms on separate halves of its split screen.

In speech-and-hearing schools, the storage scope is proving an exceptionally helpful tool; in some cases, it has enabled youngsters, in minutes, to form phrases that they'd never been able to speak.

Tucker-Maxon, a United Good Neighbor-supported agency, received its type 564 as a gift from Tektronix Foundation. Teachers find it easy to use; and the children sit enthralled watching their classmates' voices, as—thanks to the wizardry of electronics—the blessing of speech moves within their grasp.

photograph by Tom Jones



HOW TO BUG PEOPLE

For more than a decade, scientists have been studying man through miniature radio transmitters swallowed by patients, and recording the results through radio telemetry from inside the human body.

Dr. R. Stuart Mackay, professor at the Space Sciences Laboratory and Medical Physics Division of the University of California at Berkeley, is using a Tektronix Type 561A oscilloscope with 2A63 and 2B67 plug-in units as a readout device in studying gastro-intestinal pressure.

The "radio pills," the size of large vitamin capsules, reach parts of the body that would not be accessible to study without surgery, and can transmit from there, continuously, for a year. Ingested transmitters have been built to transmit radiation intensity, heartbeat, temperature, acidity and oxygen tension. Some transmitters can even pinpoint the site of bleeding.

Other transmitters have been implanted in animals: Thermistor units are being used at the Oregon Regional Primate Center near Beaverton to study problems of fertility by following temperature variations in female monkeys.

Carter Collins, biophysicist and senior research member of the Institute of Visual Sciences at the Presbyterian Medical Center in San Francisco, has perfected a 2 cu. mm. transmitter, which can be placed in the human eye. The eye remains functional, and Mr. Collins, using a Type 564 oscilloscope, makes absolute pressure measurements in living tissue—which may supply considerable basic information about glaucoma, in which disease a rising pressure within the eye can lead to permanent blindness.

Dr. Mackay says the techniques of using ingested or implanted radio transmitters, which have progressed much further than many scientists realize, have found one of their most significant uses in testing the effects of certain drugs.

KISS OF DEATH

The bite of the "kissing bug" feels like the sting of a wasp. The bug, however, transmits deadly chagas, a disease that affects the cardiac system. Death, which frequently occurs, appears to be the result of a heart attack.

Dr. M. S. Mayer, an entomologist in the Agriculture Research Service of the US Department of Agriculture, Gainsville, Florida, is using a Tektronix Type 502A oscilloscope as a readout device in studying the nerves on the kissing bug's antenna, which respond to airborne odors.

The kissing bug—Triatoma infestans—is prevalent in Texas, Central and South America. It bites people on the lips and face with its mouth, as they sleep. Dr. Mayer, who has been studying the bug for the past two years, believes it is attracted to people by heat and skin odor.

He is using the oscilloscope in conjunction with a motion-picture camera to study the bug's response to human odor. Dr. Mayer has placed the bug in a non-human-odor environment, detecting a definite nerve response as he introduces human odor.

Dr. Mayer and his two-man staff—an engineer and a technician—are probing the bug's odor-sensing antennae with a microprobe that has a diameter of 10 microns—393.7 millionths of an inch. The actual target, on the antennae, that they would like to probe has a width of .2 micron, which is 7.874 millionths of an inch. (The width of this Tek Talk column is 53,975.1 microns.)

Dr. Mayer and his colleagues hope that, once they learn more about the kissing bug, they will be able to find a way to eliminate the insect. Or at least find an effective repellent.

DOWN WITH MANDUCA SEXTA

Build a better moth trap, and the world's tobacco growers may beat a path to your door.

It's easy enough to design a trap that will hold the tobacco hornworm moth (Manduca sexta), but how do you get him to fly into it? The answer has been to lure him with colored lights; the question is, what color does he like best?

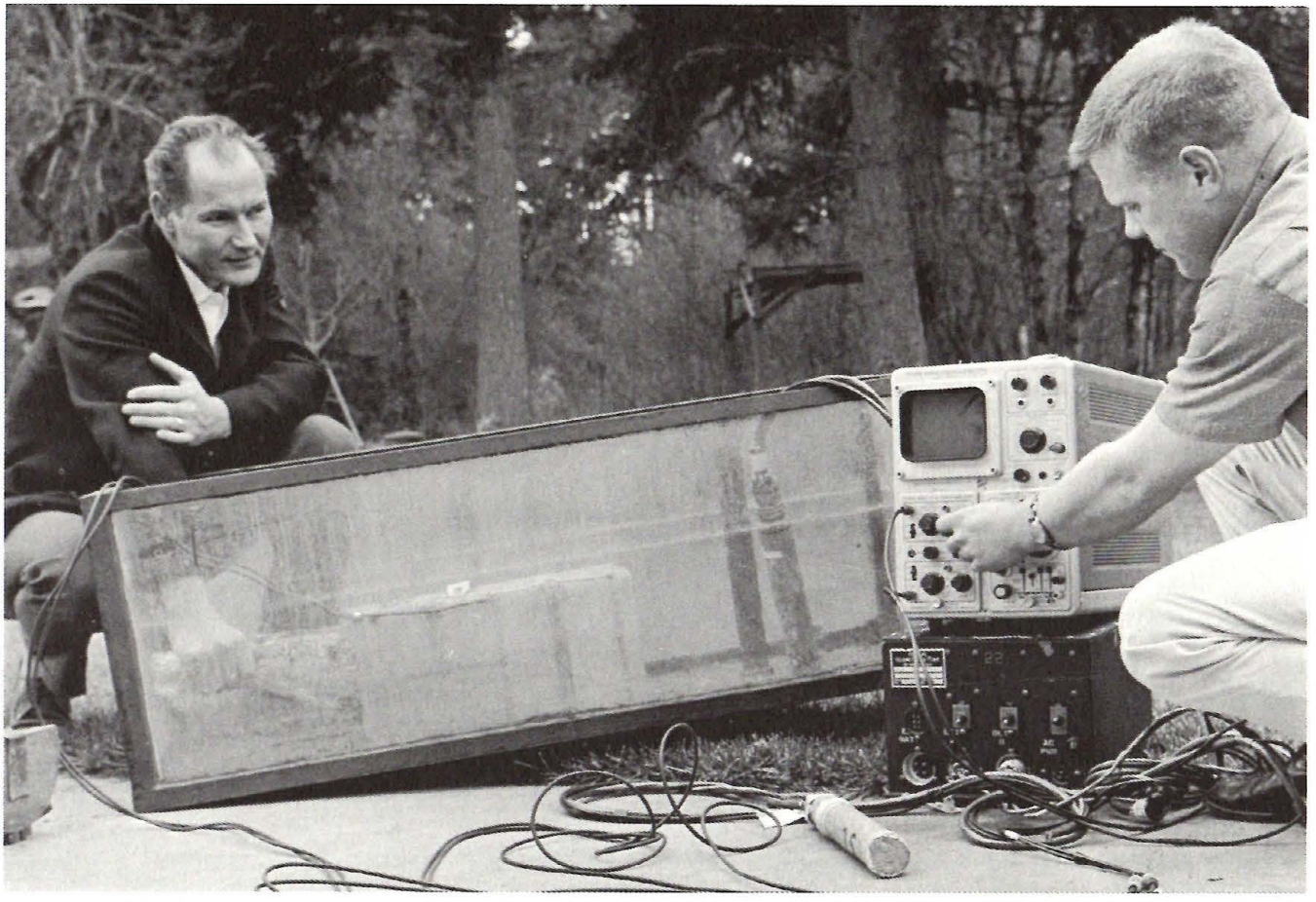
To find out, researchers in the US Department of Agriculture and Virginia Polytechnic Institute are giving moths "eye tests," and reading the results on a Tektronix 502A oscilloscope.

Earlier research showed that Manduca sexta is most excited by lights in or near the ultraviolet end of the spectrum, and least intrigued by those in or near the infrared end. Current work seeks to learn **exactly** what colors he prefers.

The moth, flat on his back in a darkened box, has an electrode on each eye and a ground electrode in the abdomen. One eye is covered; into the other, researchers shine monochromatic light —at wavelengths between 3000 and 6000 angstroms. On the scope screen, they read the resulting electroretinogram. This graph shows the difference in the two eyes' response, relative to the ground potential. It measures the impulse created by the collective depolarization of the retinula cells, in the back of the eye.

The scope is usually set at a sweep rate of 0.5 cm/sec. and sensitivity of 0.5 mv/cm. To obtain the electroretinogram takes three to four seconds, allowing the entire waveform to be made in one sweep.

A vertical signal output mod kit was installed on the scope, to amplify the signal so it could be tape-recorded, and thus stored for additional study. Also, a Tek scope camera, its shutter synchronized with the sweep trigger, can photograph the waveform.



The researchers point out that the farther you go, the more problems you uncover. But they're hopeful; useful data are being obtained. Someday Manduca sexta, a major economic pest, may be a thing of the past, thanks in part to Tektronix instruments.

A FISH STORY

Dick White and Bob Johnson, both in Accessories Design and both dedicated fishermen, wanted to be certain there'd always be plenty of fish to catch.

So, they volunteered to help the Oregon State Game Commission install an electronic fish counter at Threemile Dam on the Umatilla River, to be used by district fishery biologists. The data supplied by the counter should help insure a continuing supply of fish in the river.

Dick and Bob first checked out the components of the system, using a king-size aquarium set up in a neighbor's garage. For this preliminary check, they borrowed from Tek a 561A oscilloscope with 3A72 and 3B3 plug-in units.

When they were ready to carry out the actual installation, they borrowed a battery-powered 321A oscilloscope—and were glad they'd had the foresight to do so. A component in the system failed during the rough trip to the Eastern Oregon site. Using the 321A, Dick and Bob quickly identified the problem, and finished the job. After installing the system, they instructed the fishery biologists in its use and maintenance.

They used the 'scopes to measure oscillator output of the counting tunnels, and thus determined if the tunnels were accurately balanced. Different-sized fish have different effects on voltage in the tunnels. The biologists wanted to count only the ones over a certain size. The 'scopes were used for delicate measurements to adjust the tunnels to count only those fish. (For some of the tests, they pulled a frozen jack salmon through the tunnel with a string.)

Dick and Bob are still using the 561A and plug-ins at home, to modify the original counting-tunnel design and perhaps develop a completely new design. Their plans include helping install another fish counter at a different site if the installation is approved.

A letter to Lang Hedrick, Engineering manager, from P. W. Schneider, Game commission director, reads in part:

"Many people have a real interest in wildlife resources, and it is not uncommon for offers of voluntary help to be made. It is, however, rare when individuals with such specialized talent offer their time and talents freely, and with such enthusiasm."

THE INDIVIDUAL

"If we draw our strength from the uniqueness of each individual, together we become more than the sum of our numbers"
—Tektronix philosophy statement, February 1962.

DOROTHY YOSS
change—for the better

When Dorothy Yoss came to Tektronix in 1956, the three people in her group worked on parts preparation for just two types of CRT gun, the T51 and T54. Their most precise production and testing tools were those old reliable instruments, the hand and eye.

They cut leads by hand, then bent them over their fingers to get the right curve. Deflection plates were hand-bent. The leads were welded on by hand—placement was by guess, and so was adjustment of the welding equipment. The girls usually had to sand "burrs" off the finished weld.

But is was a cozy group—they really had "togetherness." At one time, the girls sat at a long bench in a room so narrow that, when anyone needed to walk its length, everyone pulled in her chair. They worked in street clothes.

Now, they work in a "clean room," with the antiseptic atmosphere of a surgical theater. The girls wear white smocks and, in most work areas, safety glasses. In one ultra-clean section of the Parts Prep area, the hospital atmosphere is heightened by people wearing pale green smocks and caps looking almost identical to surgeon's garb.

Where people once sat hand-cutting and bending leads in daily quantities of perhaps 100, a machine now obediently turns out precisely cut and bent wires in quantities of thousands or even tens of thousands per day. Special jigs now guide the positioning of parts for welding, and welding machines can be set precisely for each operation. A machine turns out neatly bent deflection

plates—but a human must then measure them on a precise instrument called a sine bar. After checking for errors, she makes subtle corrections when needed to assure precision that machines can't accomplish—and that unaided human faculties **never** could.

When we built only two relatively uncomplicated types of CRT gun, we could afford to overlook some human error. But to build some 36 different types of gun for CRT's that can deliver any performance a design engineer might demand of them, we must have the best modern equipment and the best people to operate it.

Dorothy says emphatically that we couldn't produce the quality or the quantity we **must** produce today without automation and mechanization. "Although," she remarks with a mischievous twinkle, "we had a better reject rate in the old days than we do now. Of course, we didn't have modern test equipment back then—if we had, I'm sure the reject rate would have been much higher."

What has the increased use of machinery done to her job? Made it much more varied and interesting, according to Dorothy. She's advanced to a job of scheduling the work for her group.

In the good old days, Gun Fabrication built enough of each type of gun to keep ahead of production. Now, a complex scheduling system is necessary to coordinate plant-wide production of our greatly increased array of instruments.

A head scheduler for all of CRT sets up six-week schedulês; Dorothy receives them and breaks her group's part into one-week segments. She then distributes the work among the girls in the group; it's her responsibility to see both that the work gets out on schedule and that the girl's work assignments keep them comfortably busy.

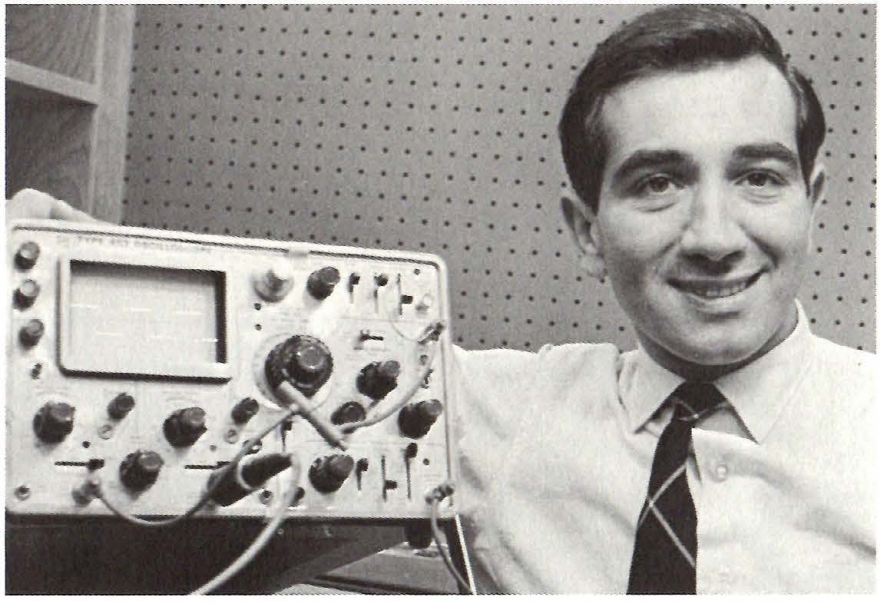
Dorothy coordinates the tasks of 20 girls doing the work she and two other women once did, plus some processes that didn't exist before. The welders still weld, a tester always tests, but each person works on a much greater variety of parts and processes. About 800 different parts are handled by the Parts Prep group now. Of these, some are built in the pressroom and degreased and washed in Dorothy's area. From the time a part leaves the punch press until it's put into a finished gun, Dorothy must see that a correct inventory level is maintained for that part.

Dorothy still does some production work, in addition to scheduling.

Whether welcoming a new girl to the group and helping her fit in, or learning and helping begin a new production process, Dorothy has enjoyed her part in the constant change and growth through the years—and she's eagerly waiting to see what will happen next.

NORBERTO MAZZONI

our man in Rio, etc.



Buenos Aires and Caracas in September, Rio de Janeiro in October, Santiago in November. Business as usual in the midst of a revolution. A quick flight back to the States to keep up with the latest developments. Sounds like something for the jet set, or perhaps an itinerary for a double-O secret agent. But it's all in the line of work for Norberto Mazzoni, our man-on-the-spot in South America.

How did Bert happen to get this challenging assignment?

It started in 1964, when we decided to do something about the need for top-notch, Tek-trained technical representation in the growing South American market. Our distributors in the South American countries represent various product lines in addition to Tektronix. It wouldn't be practical for their technical people to specialize in our products, or to keep as up-to-date as we'd like on the newer instruments. The volume of Tektronix business in any one country didn't, at that time, justify a full-time Tektronix specialist on a distributor's staff.

The answer was to find a highly qualified engineer, train him at the factory on Tektronix equipment, then let him divide his time among the distributors. He would both supplement the services of the distributor's technical people and help them keep current on our product line.

Bert is an individual uniquely qualified for the job. A native of Buenos Aires, he received his engineering degree from the University of Buenos Aires in July 1961. He was one of two students from Argentina selected that year for graduate study at Philips International Institute in The Netherlands. He completed a year at the institute; then returned to Argentina, where he worked for a local firm until he came to Tek for training in 1965.

Fluent in Spanish and English, Bert can communicate passably in several other languages. If nothing more, he learns to say a few of the most useful sentences in the language of the country where he's located. For example, he won't offer to make a polished speech in Dutch, but he can say, "Ik houd van jou."

While he finds electronics exciting, he admits that his real vocation is girl-watching—a reasonable pursuit for an eligible bachelor.

Bert's formal status in Argentina is that of an independent technical consultant specializing in Tektronix products.

From his office in Buenos Aires, he makes flying trips to cities throughout South America. In places where we have Tektronix distributors, he provides assistance and support to the distributor's own technical staff. This might include training sessions on the newest Tektronix instruments, help with trouble-shooting and maintenance problems and demonstrations of new instruments. Bert frequently gives seminars and training sessions for customers and operators who use our equipment. He lectures at local universities. His knowledge of technical Spanish is especially valuable in these activities.

When he isn't traveling in the line of duty, Bert gets around quite a bit just for fun. During his stay in the Netherlands, he made side trips to London, Paris, Luxembourg, Belgium, Zurich, Lisbon, Madrid, several parts of Germany, several cities in Italy. While in the USA, he probably saw more of the country than many US citizens ever do.

He's enjoyed seeing the world but, if you want to hear some real enthusiasm, just ask him about Argentina. He's a one-man tourist bureau. Buenos Aires, he says, is not like any other city in the world. However, he comments, it does resemble Paris somewhat. He mentions just one disadvantage—golf is a much more expensive game there than in the USA. Equipment alone costs perhaps four times what it does here.

Technology in many South American countries, as in other emerging areas of the world, is still in an early stage of growth compared with older industrial nations. Back in Buenos Aires, Caracas, Rio, Santiago and on through South America, Norberto Mazzoni is helping secure Tektronix a part in that growth.

MINGO FIGUEROA
stepping up

In July 1965, Domingo Figueroa was doing what he'd done all his working life, following the fruit and vegetable crop from state to state, the same perpetual cycle that governs the lives of thousands of migrant farm workers throughout the USA. 'Mingo and his family could expect lives of hard physical labor, seasonal income, hit-or-miss schooling for the children.

They wanted more than this, so they did something about it. In August 1965, 'Mingo applied for work at Tektronix. He had no specialized skills, little formal education and a limited knowledge of English. But he did have a reputation with former co-workers and employers as a good, hard-working man, a steady worker who needed little supervision, and a person who got along well with other people.

In spite of the meager income in the kind of work he'd been doing, 'Mingo had a clean financial record, a history of always meeting his obligations. He showed a feeling of pride and responsibility in doing his work well, whatever the job.

Personal potential weighs heavily in Tektronix hiring practices. So in August 1965, 'Mingo was hired for a job in Electrochemical Production.

During his first year at Tek, he took three English classes offered under the Tektronix Education Program. Then, with an improved command of the language, he took two more specialized job-related courses.

He learned on the job as well as in class. In January 1966, five months after he came to Tek. 'Mingo was promoted from electroplater's helper to metal-finishing operator. In the new job, he buffs and polishes parts to prepare them for the final step of electroplating. The parts have a good deal of time and money invested in them at this stage; the processing must be exact. Some of the parts are built for tolerances measured in thousandths of inches; care must be taken to avoid changing the measurements in the buffing process. The job requires skillful use of a variety of expensive and comlicated equipment.

'Mingo hasn't been contented to achieve only for himself—he's also working to help others build better lives. He now holds membership in independent volunteer organizations that help migrant workers improve their English, find steady jobs and better their housing and living conditions. The volunteers offer other help when needed, such as providing transportation from the camps to Portland hospitals.

'Mingo was the first of a number of migrant workers who have been hired for permanent jobs at Tek. His example on the job helped confirm, both to Tek and to others who would apply here, that people whose entire experience had been seasonal farm and field work could succeed at year-around industrial jobs.

'Mingo says he wants, through Tek Talk, to thank Tektronix for having faith in him and helping him get more education to advance himself; people who work with him say that Tek has been more than well-rewarded by his loyalty, reliability and all-round good performance.

'Mingo's own work and planning have enabled him to move, step by step, from a background with little promise to a situation where he can give his family a better life in the present and educate his children for a better future.

SEP: Tek and students size each other up

How many doctors earned college money by washing dishes in the cafeteria or pumping gasoline? How many teachers baby-sat and picked strawberries to earn an education? A great many.

How many chemists and electrical engineers worked their way through school doing chemical research and electrical engineering? Few, if any—until recently.

Vacation fill-in jobs have long been available to students, but now industry has discovered a more constructive approach. Some companies have instituted plans for placing students in vacation jobs that relate to their choice of a career. Not many companies in the western United States have such programs; Tektronix does.

Since the company began, we've hired students for vacation fill-in jobs. Some of them were studying for careers in electronics, but no formal effort was made to match them to jobs that would augment their academic training. Even so, many of them found what they wanted at Tektronix and returned to make careers here. Among them were Bill Polits, vice-president, Engineering, and Bob Fitzgerald, executive vice-president.

From this informal approach, our present two-part plan evolved We still hire students for vacation fill-in work. Separate from this fill-in hiring, we have a Student Employment Program designed to place selected students in jobs that will enhance their professional training and allow a mutual evaluation between them and Tektronix.

Sometimes, when we have a promising student who isn't quite ready for an SEP-level job, we place him in the most suitable fill-in job we can offer. He gains exposure to the industry and can start to get acquainted with Tektronix. When he develops the background to qualify, he may move into an SEP job.

For every summer opening—fill-in or SEP—we have an average of 10 applicants. Several will be well qualified; we can fill jobs only by competitive selection. Because of the surplus of qualified applicants, we may offer fill-in jobs to people ready to handle SEP assignments. Then, they're first in line if additional SEP openings develop during the season.

Managers who expect to have vacation fill-in or SEP openings send their requests to the program coordinator, Norm Silver, as early as possible, usually starting in December. Most interviews take place during Christmas and spring vacations. Chrismas vacation interviews are primarily for applicants who won't be able to come in during spring vacation. Most applicants are from local schools, but some are from MIT, Stanford or other out-of-state schools. The Employee Relations department coordinates all student employment.

We can sometimes hire students to work during Christmas and spring vacations as well as in the summer. Also, some colleges have cooperative programs under which students can work as much as six months of the year and go to school the rest of the time. Under the International Association for the Exchange of Students for Technical Experiences (IAESTE) program, foreign students can come to work up to a year at a time. Last year we had one ex-

change student from West Germany and one from The Netherlands.

Our plan is flexible enough to allow a practical matching of students to jobs in **any** way that will accomplish the most for the student and the company.

Candidates for SEP jobs are screened as carefully as applicants for permanent professional positions. Written tests, interviews with professional placement specialists and with managers in the job area, recomendations from the candidates' teachers and former employers, all are part of the selection process. A record of scholarships and other scholastic awards, self-initiated projects, participation in science fairs and similar extracurricular activities weigh heavily in an applicant's favor.

Most SEP participants are college juniors and above, but some outstanding high-school graduates have been accepted. Recipients of Tektronix Foundation scholarships often receive preference for summer employment; whether in SEP or fill-in jobs depends on interests, career goals and qualifications.

One such applicant, newly graduated from high school, scored 40 out of 50 on an electronics test where the average score is around 20. Most SEP applicants we've hired for technical jobs made scores on this test that compared favorably with the scores of many experienced professional engineers.

Many students qualify for technical jobs started experimenting with tools as small children and developed technically oriented hobbies—such as building ham radio gear or designing hi-fi and stereo circuitry—during their high-school years. Most of them excel academically, and they all seem to have a natural knack with screwdrivers and soldering irons. One fellow in the 1966 SEP, with some help from an inventive father, started building remote-control robots when he was four. He remarked on his application form, "I feel that I was born to be an inventor."

The same policy that guides all Tektronix employment practices applies to our hiring for vacation fill-in and SEP jobs. Hiring is not influenced by race, religion, national origin, sex, age (except where laws set limits) or personal relationships. As fairly as judgment can determine, candidates are selected on their own merits. Of course, Tektronix employees are eager to see their young relatives and friends come to work at Tek, and many have been accepted. But they earned their positions in the normal, competitive process.

Because Tektronix is engineering-oriented, most SEP jobs are in Engineering and related technical areas. The next category is the physical sciences—chemistry, chemical engineering, mathematics, physics. We've also offered meaningful work experience to business administration majors and students of computer sciences. We hope to expand opportunites for promising students in these fields as the SEP develops.

Younger SEP participants, especially new high-school graduates, usually start in Test Training and move to more technically challenging jobs as they progress academically, and as their field of interest begins to focus more specifically.

The SEP is not primarily a training activity. Student employees make productive contributions to Tektronix; the natural result of their effort is that they learn.

A math major in Data Research converted some computer programs involved with numeric control from the IBM 1410 computer to our new IBM 1130 system. A physics student working in electron optics carried out a series of measurements to determine the effects of electrode misalignment on the position, shape and size of the CRT beam spot; to do this, he developed a special CRT gun with moveable electrodes built in a vacuum system. An electrical engineering student prepared a report suggesting a modification that would make one Tektronix instrument useful in a completely different field.

Being temporary employees, the students don't receive profit share. But their contribution is recognized in the level of their base pay, and the practical career experience they receive couldn't be bought in any classroom at any price.

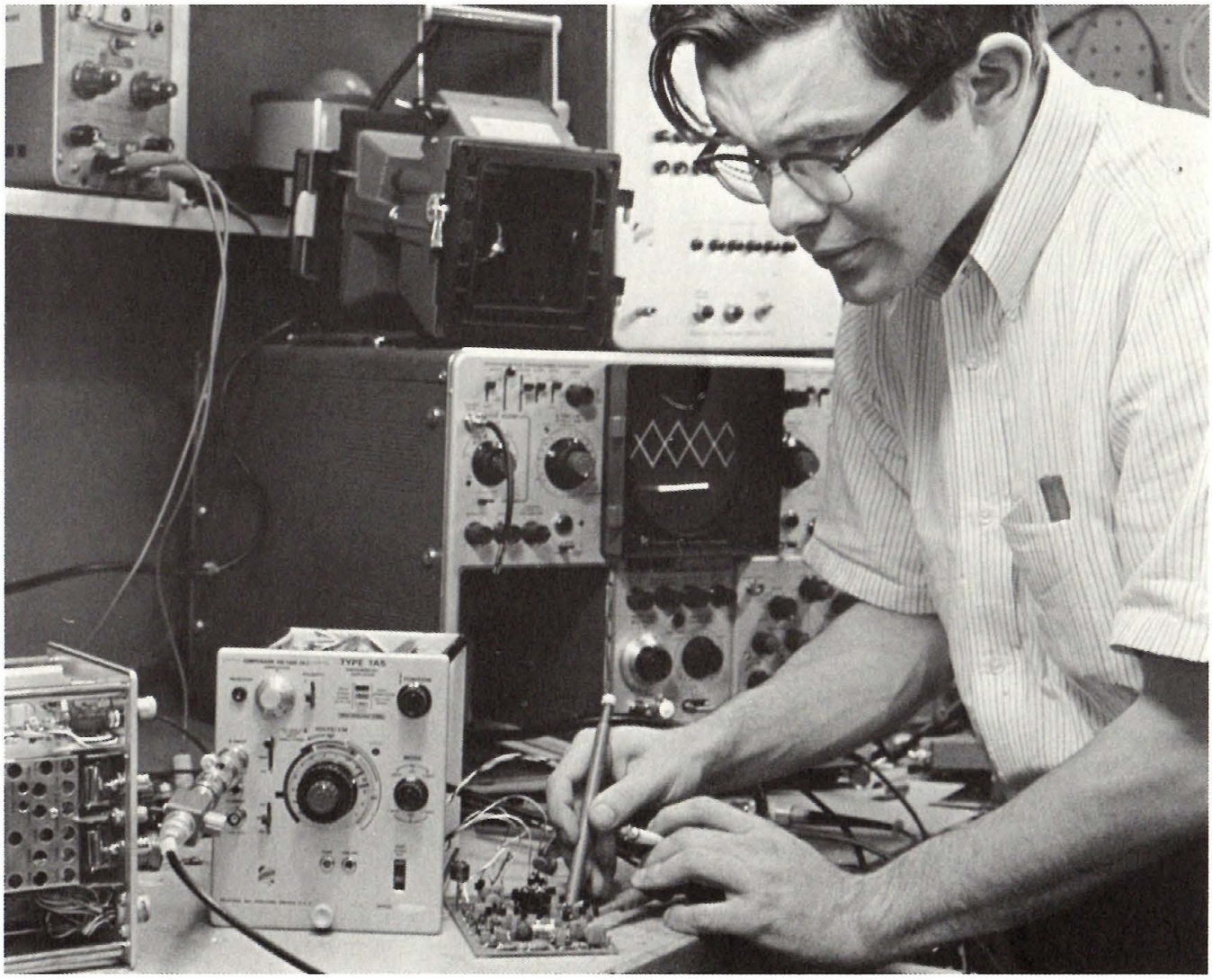
The SEP allows students to learn about their chosen profession in actual practice, and to learn what Tektronix could mean to them in career terms. And it allows us to evaluate their long-range potential.

So that SEP students will see as much of the company as possible, they receive the same new-employee orientation as permanent employees; in addition, they visit a different part of the company every week to observe and discuss operations with the managers. This broadens their understanding of the Tektronix environment and lets them observe other professional opportunities.

SEP participants receive the complete, formal orientation, because the long-range recruitment possibilities are greater for them. Fill-in employees receive a briefer orientation limited to their own work area.

SEP employees learn more than just the mechanics of getting a piece of work done, and a realistic understanding of the line of work they intend to pursue. They learn something about **themselves.** They may discover that an industrial situation offers the challenges and rewards they need—or, they may find that industry **isn't** for them, and so can direct their efforts toward pure research or teaching. One student engineer remarked, "Now I know what an engineer really does."

A result of the mutual, on-the-job evaluation has been that we've offered permanent jobs to about one out of five SEP participants since the program began. Because the evaluation has been thorough, these job offers are almost inevitably accepted. A number of junior-year students will be returning to the program in their senior year, and perhaps during some years of graduate study. So the one-in-five figure may go higher when the students still in the SEP complete their formal education.



PHIL CROSBY, now a project engineer in the TV and Conventional Oscilloscopes area, began work with Tektronix during his junior year at Portland's Wilson high school. Here he uses an oscilloscope to test a printed circuit board from a new Tek plug-in.

If assimilation continues at this rate, the SEP will have proved itself an effective, long-range recruiting device. Permanent employees recruited in this manner will have had the advantage of a sound preliminary orientation to the company; the adjustment gap when a student steps from academic to industrial environment will virtually be eliminated.

The long-range-recruiting feature is limited by the number of openings available when the student finishes school. But, even if he doesn't find a permanent spot at Tektronix, he will have gained experience and a valuable job reference. And we'll perhaps have gained a customer who really understands our product.

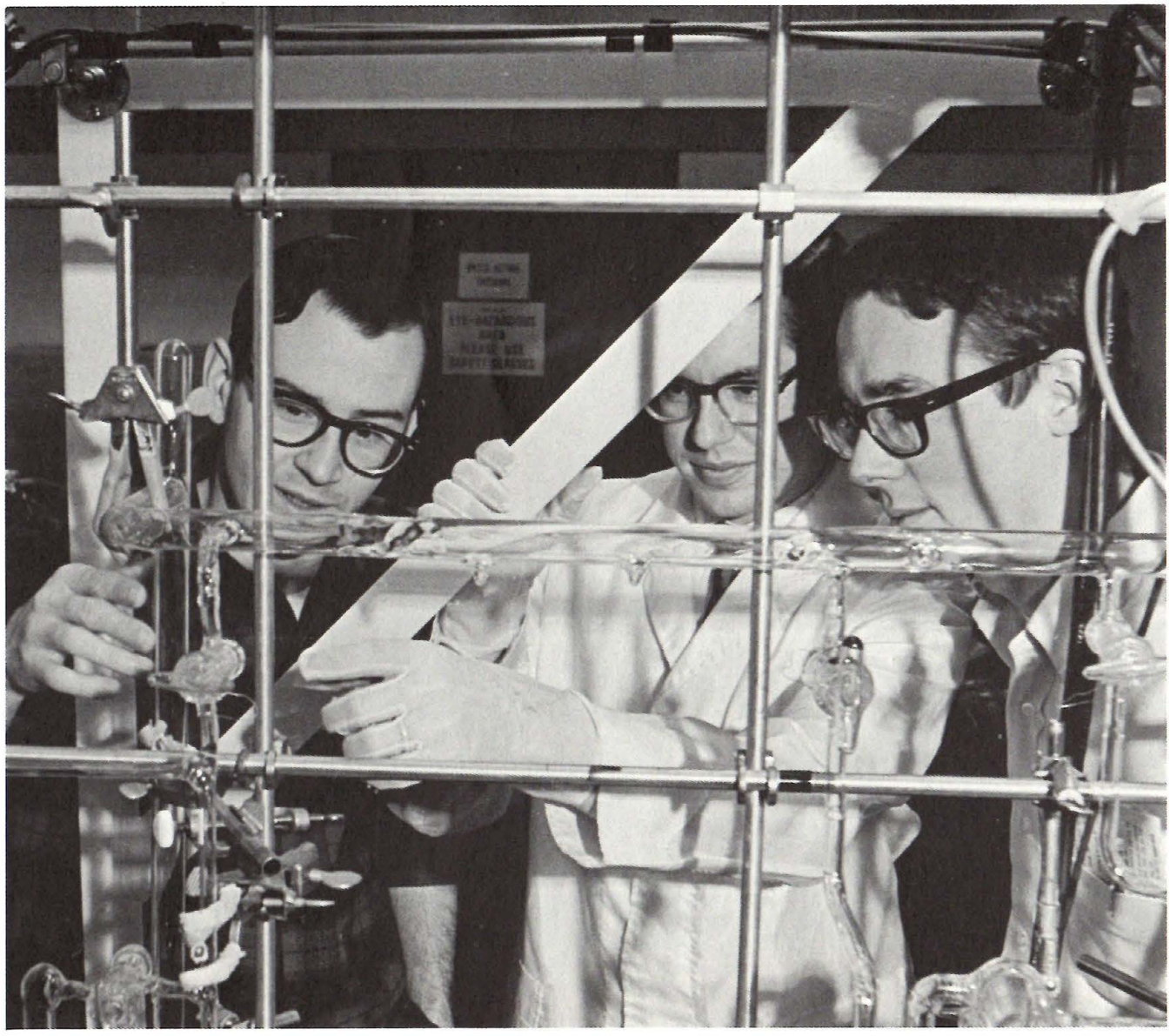
The value of this program, both to Tektronix and to the students, was highly commended by President Howard Vollum, in a recent report to shareholders.

When any SEP employee terminates, he and his manager fill in evaluation sheets, and an exit interview is conducted by a qualified staff member. Some representative responses:

A graduate student in Chemical Engineering who worked in Electrochem's development engineering group said he was amazed at the opportunity for research in industry; he was impressed with the sophisticated levels of work being done in his field.

This same student devised original tank set-ups and plating racks. This employee is partially blind but, at Tektronix, physical handicaps affect hiring only when some aspect of a job demands a particular physical capability—and perfect vision wasn't required on his job. His manager would be glad to see him back.

A graduate student studying for his master's degree in business administra-



TEK'S 3D ADVANCED Materials area has drawn heavily on scholastic ranks for obtaining its technical personnel. Here are three who began at Tek while students: From left, Jim Richardson, Dean Casey and Mike Templeton.

tion worked as a financial systems analyst. His parting comments were, "I cannot imagine a position for summer employment which would have provided more of an educational opportunity. I was able to examine the corporate operations from the inside out, and had any and all information sources available, along with extremely cooperative co-workers."

"Cooperative co-workers" is perhaps the most typical remark of all. The ability of the students to learn from the job depended much on this cooperation. Almost every employee in the student program, and in vacation fill-in jobs, made some emphatic comment about the pleasant working conditions, friendly people and informal atmosphere.

Although student employment program jobs offer the greatest scope for accomplishment, students who handle routine fill-in jobs also receive their share of praise. A memo to the summer employment coordinator from one manager reads, "All four of the summer boys were good in the performance of their jobs—they always put forth maximum effort, no matter what the work was— or whether they liked it or not."

That comment tells a lot about both the SEP and the fill-in jobs—"maximum effort, no matter what the work was—or whether they liked it or not." This is much of what real-life job experience meant for the students: The chance to accept a job, to stay with it even if they found it less exciting than they'd hoped, and to put their best effort into any work assigned to them.

THE FIRST HINT OF spring makes Tektronix coffee breaks into optional outdoor events. Technical Center is in background.