Some things are changing for the better.

Many people know us as an instrument manufacturer: we make more than 2,000 products for measurement, test and analysis. Others know us as a computer company: more than 10,000 own our programmable calculators and computers. We prefer to think that our business is to serve measurement, analysis and computation needs...in science, industry, medicine and education. This is the rationale behind every new instrument, computer or system that we tell you about in these ads. This month:

A sensor-based system that makes real sense.

There's a growing demand in industry and research laboratories for sensor-based computer systems that handle great quantities of analog and digital information. Systems built from programmable instruments usually are too expensive; people pay for equipment features that they don't need. Yet the alternative has been a piecemeal approach—break down the customer's problem into several parts and use separate "mini-systems" to solve each part independently.

Now there's a third choice—Hewlett-Packard's new family of compact data acquisition and control systems for cost-effective automation in industry and research. A 9600 Series system monitors, collects, and processes information from sensor-based sources. It then can generate reports, control power supplies, alert operators, drive graphic displays and plotters, and produce control signals for closed loop operations. Although you can't be everywhere at once—supervising and trouble-shooting—our system can.

Two new subsystems within the 9600, one analog and one digital, now do the things a number of programmable instruments used to do. These instrument functions are contained on plug-in cards. Instead of adding individual instruments, you merely slip in an inexpensive printed circuit board.

The 9600 data acquisition systems are modular. Start with a minimum low-cost system to control a single test or experiment, and expand with your growing needs.

The full story on the 9600 System family is yours for the asking.

Nothing can outperform this new digital GC—even at twice the price.

Because the gas chromatograph (GC) is essentially a tool for qualitative and quantitative chemical analysis, its value ultimately depends on how well it does this job. Over the years, many new models have been introduced that perform more accurately than previous
This would be an unusual case—using a battery-powered counter to check out the frequency of a mountain rescue-team's radio equipment—but it illustrates that HP's portable instruments can go anywhere service is needed.

Instruments—at a price. The truly amazing thing about the new HP 5700 GC is this: it produces more accurate and precise retention time (qualitative) and peak area (quantitative) data than any GC ever built. Yet it costs about half as much as top-of-the-line GCs of comparable quality.

A new bulletin on the 5700 fully documents this perhaps startling claim. Until you have a chance to study this data consider this: one of the first 5700s off the production line was used "as is" to make two series of replicate analytical runs, one series before and one after an overnight shutdown. The sample used in both series contained seven components, out to C17.

The results speak for themselves. In terms of repeat accuracy, the mean retention time of each of the seven components differed less than 0.01 minute after the overnight shutdown; the normalized area % varied only within ±0.001%. In terms of precision, the standard deviations of the replicate retention time measurements fell within 0.0175, both before and after the overnight shutdown; the standard deviations of the area % data were all within 0.0038. No other GC, regardless of price, can do better.

For a fully documented proof of performance as well as a factual description of this new all-digital, computer-compatible automatic GC, write for Bulletin 5700.

Portable instruments go where the problem is.

Capital equipment such as mobile or remote communications systems and million dollar computers have at least two things in common. They are electronically complex, and they can't be taken into a service center when they need repair. Today's traveling field service engineer must have laboratory quality equipment that will go where he goes.

HP's portable instruments enable service engineers to diagnose and repair this equipment on the spot, reducing expensive downtime. Our portable scopes are small enough to fit under an airliner seat, and, at 24 pounds, are light enough to be carried up antenna masts and into other hard-to-reach places. An HP electronic counter can be held in one hand—it takes only seconds to snap on a function module that provides the specific measuring capability needed. Then there's our multi-function meter—a high performance, instant-reading voltmeter and ohmmeter rolled into one.

And the length of HP's portable measuring capability isn't limited by the distance to the nearest wall socket. Most of our portable instruments feature their own accessory battery pack. Many can run off ordinary car, plane or boat batteries as well as a standard power line. And all of them deliver HP precision in a rugged, portable package.

Ask for the full story on portable instruments that go where the problem is. Write Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304; Europe: 1217 Meyrin-Geneva, Switzerland.

HEWLETT PACKARD
We’ve improved our 4x5 films so much

Obviously, this extraordinary offer is a result of changes in our 4x5 films.

We’ve made complex changes. Chemical adjustments in our black and white films have improved their quality and sensitometry.

And we’ve made simple changes—such as venting the color film packet to let air escape when you pull the packet out of the holder. This change improved the film’s color saturation and sharpness.

We’ve even changed the box drastically. We found that the film was being blamed for troubles that were really due to dropping the box or to vibration, rough handling or pressure.

So we’ve introduced extra-sturdy boxes and put a layer of polyurethane foam in each to protect the film. While we were at it, we color coded the boxes. Now you can tell at a glance which of the five films you’re working with.

We made mechanical changes in the film packet so that all the film components stay in register till exposure.

We have made improvements in the production process and tightened quality control.
We are very confident of the quality of our film—so confident, that here’s what we’re offering.

**Polaroid’s extraordinary guarantee:**

1. If in your judgment any picture taken with our 4x5 film is unsatisfactory for any reason whatsoever, we will replace up to 5 boxes—free.

2. We will then give you—free—all the technical assistance you need to get exactly the kind of pictures you want. Just send the pictures with the negatives and any unused film from the box to Polaroid’s Customer Service Dept., Cambridge, Mass. 02139. (Pictures submitted for replacement cannot be returned. Offer does not apply to outdated film and is limited to film sold in the U.S. It expires Nov. 1, 1972 and is void where prohibited, regulated or taxed.)

3. You can call us collect. The toll-free phone number is 617-547-5176, and it’s in every box if you need it. This direct line to Polaroid for technical assistance is available to you as often as you wish, regardless of the kind of camera or equipment you own or the type of Polaroid instant films you are using.

You’ll find the full details of this program in every box of Polaroid 4x5 film.

We’ve been working hard to perfect our films. And we want to do anything we can to help you perfect your skills. **Polaroid 4x5 Land Films**
One man's pure radiochemical...

We provide our customers with the purest possible radioactive chemicals. But sometimes that's just not enough. Sometimes a researcher needs to know exactly what impurities the chemical has been tested for.

So with every radiochemical compound we send out, we include a data sheet that specifies the initial and latest radiochemical purity of the compound, its chemical purity (when applicable), the methods used to prepare and analyze it, the recommended storage conditions for the compound, and its approximate rate of decomposition under those conditions. Nobody else does it that thoroughly.

And, if you need special tests, you can decide immediately from reading the data sheet and ask for them. You'll know you're getting the purest possible compound.

And you'll know exactly what "purest possible" means.
important if your reported trends approached statistical significance, because
then it might be argued that there was at least slight justification for your
article. Also, be sure to test, and then discuss at length, each of the compar-
sions—not just the overall one which you initially report as nonsignificant.

NANCY J. BELL

823 Suburban Apartments,
DeKalb, Illinois 60115

The actual data-gathering phase of our study was carried out during the
latter part of 1969. At that time, no be-
havioral data on discrimination against
women at the time of hiring had been
reported in the literature. Naturally,
the ideal methodology would have been one
permitting the direct observation and
evaluation of the actual decision-making
process of departments when female
applicants were evaluated in competi-
tion with male applicants. Although this
type of study was not feasible (and
still is not feasible), we are pleased that
our results, employing a less sensitive
methodology, support the discrimination
hypothesis and are in agreement with
similar studies, such as Fidell (1), and

Table 1. Summary of questionnaire responses of department chairmen by item and classification of sample for average male, average female, and superior female job applicants.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Question</th>
<th>Average male (%)</th>
<th>Average female (%)</th>
<th>Superior female (%)</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>a</td>
</tr>
<tr>
<td>Overall comparison of applicants</td>
<td></td>
<td>1</td>
<td>72</td>
<td>28</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>29</td>
<td>68</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>25</td>
<td>75</td>
<td>35</td>
</tr>
<tr>
<td>Geographical location of school</td>
<td>East-West</td>
<td>1</td>
<td>10</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>30</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>40</td>
<td>60</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Midwest-South</td>
<td>1</td>
<td>30</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>69</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>23</td>
<td>77</td>
<td>23</td>
</tr>
<tr>
<td>Quality ranking of school</td>
<td>Above median</td>
<td>1</td>
<td>14</td>
<td>53</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>14</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>57</td>
<td>43</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>29</td>
<td>71</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Below median</td>
<td>1</td>
<td>25</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>50</td>
<td>38</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>31</td>
<td>69</td>
<td>0</td>
</tr>
<tr>
<td>Age of department chairman</td>
<td>Below median</td>
<td>1</td>
<td>25</td>
<td>42</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>58</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>17</td>
<td>83</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Above median</td>
<td>1</td>
<td>19</td>
<td>50</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>31</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>44</td>
<td>44</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>31</td>
<td>69</td>
<td>41</td>
</tr>
<tr>
<td>Length of time as chairman</td>
<td>Below median</td>
<td>1</td>
<td>25</td>
<td>33</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>50</td>
<td>42</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>41</td>
<td>59</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Above median</td>
<td>1</td>
<td>19</td>
<td>56</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>50</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>13</td>
<td>87</td>
<td>34</td>
</tr>
</tbody>
</table>
with the many statistical surveys subsequently available regarding the hiring and promotion of women in universities. In Table 1, we have reproduced a summary of the statistical data underlying our analysis.

ARIE Y. LEWIN
Graduate School of Business Administration, New York University, New York 10006

LINDA DUCHAN
Albert Einstein College, Bronx, New York 10461

Reference

Cooperation

On the report "Human environment conference: search for a modus vivendi" (News and Comment, 18 Feb., p. 736), Nigel Hawkes states, "Throughout the preparations for the conference, U.N. sources have been complaining privately of the obstructive attitude the British have taken."

Quite to the contrary, the British representatives have been very cooperative and sources of constructive criticism and productive ideas. Whatever successes the Stockholm conference may have in June will be due in no small measure to the contributions of the United Kingdom. I make these observations after having recently completed a 6-month assignment with the conference secretariat.

JOHN G. WELLS
21 route de Florissant, 1206 Geneva, Switzerland

Testing for Teratogenicity

The eminent gentlemen who signed the protest (Letters, 5 Nov. 1971, p. 545) against Science's treatment of the 2,4,5-T advisory committee report (News and Comment, 13 Aug., p. 610) appear to say that if a study does find a teratogenic effect in some species when doses of a chemical are given that are far in excess of any possible human exposure, it does not constitute scientific grounds for banning the chemical. Presumably if a study does not find a teratogenic effect in some species, it also does not constitute scientific grounds for banning the chemical. What then are the scientific grounds for banning a chemical because of its possible teratogenic effects? Obviously the answer is, "There are none," since studies are not made of the effects of doses that are below any possible human exposure. (Toxicological experiments of the type needed to permit the labeling of 2,4,5-T or similar substances are usually performed on a few animals that are exposed to high doses; little effort is made to tell what would happen to the animals—not to say anything about man—if they were given low doses.) In fact, Alvin M. Weinberg (Letters, 5 Nov., p. 546) makes it clear that the establishment of a teratogenic effect from low doses is believed to be "trans-scientific," since it would take too many animals to establish such an effect.

It is not clear whether the council of the Society of Toxicology speaks for all toxicologists, for a majority of toxicologists, or simply expresses the view of an establishment in toxicology. It is curious, nevertheless, that the main appeal in the letter is to respect the views of authority (that is, of the council of the society) and of the majority (that is, of toxicologists)—not very persuasive arguments for scientists to advance.

If the council believes it has a case, then the Society of Toxicology ought to sponsor an open examination of these issues. They are "fundamental" to all interests, and light, not heat, is needed to illuminate them.

THEODORE D. STERLING
Department of Applied Mathematics and Computer Science, School of Engineering and Applied Science, Washington University, Saint Louis, Missouri 63130

Sørensen and pH

John Walsh is safe in writing (News and Comment, 3 Mar., p. 973) that S. P. L. Sørensen "achieved the first really accurate method for the determination of pH," because nobody had ever before determined it. It was in fact Sørensen's brilliant achievement to perceive that the acidic intensity of an aqueous solution is best expressed as a logarithmic function of the concentration of H_3O^+. Today, pH is a vigorous near-septuagenarian, some premature obsequies in the recent chemical literature notwithstanding.

A. GORMAN HILLS
Department of Medicine, University of Miami School of Medicine, Miami, Florida 33152
We want to be useful
...and even interesting

Expression of faith

Science isn’t all it’s cracked up to be, according to readily available curbstone opinion. There have been indications that a few prominent names in American industry have come to share this opinion, however reluctantly. Not Kodak. We seem to be plowing ahead as though there were no tomorrow. Or to put it more sharply, because there is a tomorrow.

This year—this month in fact—we began giving prizes to brilliant high schoolers at the International Science and Engineering Fair. Now! With the Sputnik scare receded 15 years into ancient history!

These prizes, as well as over 200 regional ones, are awarded for effective use of photography in a science project. It figures. Good for business.

Good for business at a different level is the program of Eastman Kodak Research Grants. This vehicle of old-fashioned faith in science has been plowing on through thick and thin for years at selected universities and colleges, large and small. They are selected not by contests but by a simple-minded criterion: we know them well.

Some are known as well to the rest of the world. They are fountainheads. In their debt stands any business that builds technology on science.

Often, however, a product of some lesser-known institution does nice work for us, gets to enjoy the job, fails to hide this enthusiasm from Old Siwash, attracts other high-performing Siwashians to Kodak. Strong Kodak-Siwash bonds form. Research grants from Kodak help upgrade the Siwash graduate program. After a while Siwash Ph.D. theses and post-docs turn up some basic things.

Basic research, honestly defined, occupies about 2% of the in-house R&D budget of many research-minded companies. (Kodak’s happens to run much higher.) The distinction from the remaining 98% has to do with the depth to which objectives are planned and who does the planning. Basic research is sometimes seen as a gambler’s game with constantly lengthening odds. This bothers some businessmen. It doesn’t bother scholars. Good for business that it doesn’t.

Random samples of facts recently learned with the help of Kodak buck on campuses and scattered to the four winds by scholarly dispersal mechanisms:

The 4-element, 6-atom molecule formamidre exists in interstellar space and has been identified by microwave spectroscopy.

The route by which nature synthesizes nicotinic acid in green plants is quite different from the route followed in molds and animals, including man.

In a reaction such as \( F^++H_2+HF^+(v)+H \), the HF product is highly excited vibrationally. Its average energy content accounts for more than 60% of the exothermicity. Such studies provide new insights into some elementary chemical reactions.

Light waves may be used as a kind of radar to follow the Brownian motion of macromolecules in solution.

In the CSs/O2 electrically pulsed laser system, the lasing is done by CO that is produced by oxygen atom attack.

When a molecule absorbs light, the manner in which the energy is redistributed within its structure governs the subsequent photochemical reactions.

An equal-opportunity employer

Kodak

We get our money’s worth and so should you
SCIENCE REPRINTS

Please use form below to order reprints. Enclose check or money order. Do not send cash.

Prices and Terms: One reprint—$1.00; two to nine reprints—60¢ each.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>10 reprints</th>
<th>25 reprints</th>
<th>50 reprints</th>
<th>100 reprints</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 pages</td>
<td>$4.00</td>
<td>$8.00</td>
<td>$15.00</td>
<td>$25.00</td>
</tr>
<tr>
<td>8 pages</td>
<td>$5.00</td>
<td>$11.00</td>
<td>$20.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>12 pages</td>
<td>$5.50</td>
<td>$13.00</td>
<td>$25.00</td>
<td>$45.00</td>
</tr>
</tbody>
</table>

AAAS Reprints, Dept. LW2 (1420), 1515 Massachusetts Avenue, NW, Washington, D.C. 20005

Encircle number according to listing above. Indicate amount of copies on line next to number.

1  2  3  4  5  6
7  8  9 10 11 12
13 14 15 16 17 18
19 20 21 22 23 24
25 26 27 28 29 30
31 32 33 34 35 36
37 38 39 40 41 42

Name
Address
City
State
Zip

Amount Enclosed

The reprints are for sale to our readers. Numbers in parentheses following the date indicate the number of pages. If you wish a reprint that is not included in this list, please contact AAAS.