We want to be useful ...and even interesting

Contrast enhancement at bargain prices
A mycologist has complained to us about the high price in contrast enhancement that is exacted by the familiar optical methods for contrast enhancement in the microscope. To watch living cultures of conidia by time-lapse movies, he needs every morsel of resolution and contrast he can scrounge. His options thin out. He hesitates to blast his faintly stirring conidia with electrons or with light kept on long enough for a good look. He is not the only biologist who can do his looking better by means of a contrast-enhancing black-and-white film responsive to short, moderate bursts of photons repeated at intervals appropriate to the nature of the live material.

Where, then, is the 16mm motion-picture counterpart of the 35mm cassettes of Kodak High Contrast Copy Film recommended to still photomicrographers who want to control contrast photographically?

Why we bother with scientists
Not always does it turn out (as above) that the right sensitized product sits awaiting call to service.

As the laboratory and the observatory escape confinement to earth's atmosphere, many and varied are the calls we get for photographic receptors hitherto neither needed nor dreamt of. Challenge has long made a fine subject for commencement orations, but some of the challenges in the day's mail must simply fatten the file labeled "Something to Think About." The rest provide something to think about sooner.

Scattered among the challenges we encounter compliments from satisfied space scientists, happy with results from new films and plates we have devised for them without aid and comfort from R&D contracts.

Typical recent cause for happiness: doubling the best previous resolution of solar images in the 30-nm spectral region.

Innate nobility of character is only one reason we mount a continuing program in the Kodak Research Laboratories to serve the cutting edge of science with new photographic needs. Another reason discovered long ago still holds. Work for science sharpens the wits, the better to deal with less stringent technical demands.

Don't ever hesitate to make stringent demands for photographic materials to Eastman Kodak Company, Scientific Photography Markets, Rochester, N.Y. 14650. We can always reply that your demands are outrageous, if they are. And so (as above), we relentlessly charm the world into ever stronger embrace of photography. The consequences of success in this endeavor require careful consideration.

Embracing photography just for fun has led legions into serious livelihoods. Though photography for fun keeps its popularity, neither the fun in this day of color photography nor the serious work typically concludes with dumping two little trays down the drain. No great need for concern there. The concern, business and personal, of one segment of our intramural technical community gravitates to the drains from places where sizable volumes of our films and papers meet our processing chemicals to produce the images we have induced the customers to want.

More than imagery is produced. The drains lead somewhere that is everybody's business, and properly so. A little black box is not ready to receive spent developer and fixer and regenerate them for return to the processing machines. A computer program is ready for activation through the Kodak Technical Representative. For any process we recommend, it tells the customer's engineers the concentration of effluent compounds and ions that will have to be broken down or precipitated out to meet standards that fish and informed public opinion can tolerate.

In formula improvement, high biodegradability is the short-range goal. The long thrust aims at low oxygen demand and low toxicity of ingredients and reaction products.

Need for rapid access to photographic results has brought harder emulsion than formerly. This yields a bonus. With less sensitivity to emulsion abrasion, squeegees now retain fixer formerly lost to the sewer. Not only is fixer comparably high in biological oxygen demand, but it costs money. Another simple way to make concern for the environment pay a cash dividend is to bubble CO₂ into the Kodachrome film developer. This precipitates valuable dye coupler compounds for reuse.

Far less film—of whatever kind—needs to be processed to make it pay to remove a component of the effluent that is 1) the miraculous foundation of photography, 2) a pollutant of ground water, 3) a scarce resource getting scarcer, 4) a Scripturally recognized motivator of men for good and evil, and 5) the subject of a carefully assayed and constantly updated credit allowance when a replaceable unit is returned to us from an attachment to the laboratory plumbing that you can find out about from Department 919, Eastman Kodak Company, Rochester, N.Y. 14650—

Silver!
Breathing is a pretty-much taken-for-granted activity. Until it stops.

Or until you look into the efforts of researchers and physicians in that field.

Measuring respiratory pressure and volumetric-flow rate is pretty
straight-forwardly accomplished with conventional transducers. But there are
other important parameters that are determined by these characteristics:
total inspired volume and breath-by-breath volume. Then there's total work,
compliance and respiratory resistance. All of these values used to have to be
calculated by hand. Tedious and time consuming. More lately they were cranked into
a digital computer. Less tedium, but still a delay. Now, thanks to EAI analog
computers, all calculations can be accomplished instantaneously and presented
simultaneously with the original measurements on a strip chart. Besides the
obvious value of showing a researcher what's happening when it's happening, our
lower-cost machines also open new doors to monitoring patients. We've got
some dramatic stories on how EAI analog computers are helping in other areas of
research into physiological dynamics. By writing to "Bio-medical", Dept. 206M,
you'll get them by return mail.

As with motherhood and the flag, consensus holds that computerized data
acquisition is with us to stay. But, in practice, it all can get a bit sticky. Take
data from an analytical instrument like a GC. A few giants in the industry con-
tinue to stumble over problems in GC like noise, signal processing, or really use-
ful software. EAI is still the pioneer here in its PACE analytical data system.
One seemingly small thing is a software technique for resolving complex GC
peaks. It consistently and accurately apportions complex areas, ranging from
overlapping components to poorly resolved shoulder peaks. Part of the technique
accommodates the usual "skew" in component elution to give consistent improvement
in accuracy of quantitative analysis. (Our research people gave a paper on it
at the 158th National ACS meeting.) It's all part of the whole PACE system--a
turnkey data system for many analytical instruments--GC, mass spec, and the like.
For a copy of the paper and a detailed booklet write to "PACE", Dept. 206M.

A topic certain to stir up the citizenry these days is pollution--any kind
of pollution. Take a simple thing like free oxygen in water. Overload the water
with oxygen-hungry chemicals--no oxygen. Or develop too many organisms--plant life
prospers (called eutrophication) and no oxygen. Either way, no fish. And with no
fish, you've upset the water ecology. Pragmatic scrutiny tells us we can't shut
down our industries to bring back pristine, airy waters. Fortunately, we can
imitate these conditions by computer simulation, and get a grip on the ameliorative
aspects of a solution.

Recently, EAI provided the HEW with a hybrid-computer simulation of the
Delaware River Estuary. From this simulation engineers can tell where to best
locate stand-by reservoirs, what flow rates to employ, and when to use them. We've
written this one up. A request to "Delaware", Dept. 206M, will get you a copy,
and get us both cracking on another solution.

In olden times petrochemical-process design involved finding rate and
equilibrium constants for several reactions required a trial-and-error method.
Much trial. Much error.

Most process designs involve the solution of ordinary differential equations
--in a lumped-parameter system where changes are taking place in time but not
space. With the use of analog computers, solutions poured forth. However, distributed
parameter systems involve changes in time and space simultaneously--expressed by
partial differential equations. Many approaches to PDE solution have evolved for
digital computers. But such solutions consume more and more hardware, with
ever-present error creeping back in as problem complexity increases.

Hybrid computers clear this difficulty up. Kinetic data are programmed into
the analog portion, actual results go into digital computer memory. The analog
makes a series of process condition runs, the digital stores the data, matches the
results from the plant and computes least mean-square deviations. The "solution"
has been found when results of simulation most closely match actual conditions,
and no further reductions can be made in mean square deviation values. Optimization
is achieved--in time, money and results.

After much struggle, EAI is pleased to offer a software package in this
arcane specialty--write to "Kinetic", Dept. 206M. Electronic Associates, Inc.
West Long Branch, N.J. 07764.
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