Photographers call it underexposure. We call it absorption inability. The first you get from too little light, the second from the wrong kind of light. But the result is the same; there are things there but chances are you don't see them.

A good way to get around this problem is to use the Uvicord SII detector from LKB.

This new and improved version of one of the most widely used LKB products, (since 1958 we've sold a good twenty thousand Uvicord detectors) can monitor at 206, 225, 254, 280, 313, 365 or 405 nm. Just choose the wavelength that will give you the best result for your sample. If the 254 and 280 nm filters let you see nothing and 206 too much, the new 225 nm filter will be perfect. For peptides, for instance.

Uvicord SII also has a unique high intensity lamp (av. life 6,000 hrs.) which, combined with the short wavelength filters, can give you up to two hundred times greater sensitivity.

Get in touch with LKB for a demonstration. We think you'd be interested in a couple of other new Uvicord SII features like the variable time constant filter and it's indicator for baseline adjustment.
DON'T JUST SIT THERE WORRYING...

PHONE TIAA (TOLL FREE) FOR HELP, RIGHT AWAY!

Perhaps a new baby, or a big mortgage debt, or a recent salary increase, or just plain double-digit inflation has you worried that the life insurance coverage you presently maintain for your family isn't enough to take care of them the way you do. Whatever your concern, you can get help by phoning the TIAA Life Insurance Advisory Center and talking with an Insurance Counselor.

Every week hundreds of your colleagues in education call these trained TIAA professionals to discuss such questions as:

Which kind of life insurance is best for me? How much should I have besides group coverage? What would it cost?

There's no obligation of course; it's part of the service TIAA provides to the education and research communities.

It's a fact that most educators with a family to raise and educate are seriously underinsured, and inflation isn't helping. They need as much immediate family protection as they can get for their money. That's why our counselors frequently suggest low-cost TIAA Decreasing Term policies when it's clear that a sizable chunk of new coverage is essential.

Just $167 a year* buys a $100,000 20-Year Decreasing Term policy for a man aged 35 or a woman aged 40!

This example is drawn from the following table illustrating yearly costs for different initial amounts of protection on this plan:

<table>
<thead>
<tr>
<th>TIAA 20-YEAR DECREASING TERM INSURANCE COST EXAMPLES FOR SELECTED AGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issued to a man aged</td>
</tr>
<tr>
<td>Issued to a woman aged</td>
</tr>
<tr>
<td>Annual Premium</td>
</tr>
<tr>
<td>Yearly Cash Dividend</td>
</tr>
<tr>
<td>Yearly Net Cost*</td>
</tr>
</tbody>
</table>

*Annual premium, less cash dividend payable at the end of policy year on current scale. Dividends cannot be guaranteed or estimated for the future, but TIAA has paid dividends every year since its founding in 1918.

So you see, there's no reason to worry. At costs like these you can comfortably afford to give your family all the protection they need.

For answers to your questions, dial TOLL FREE 800-223-1200 (In New York call collect 212-490-9000). If you prefer to receive information by mail, just fill out and send the coupon at the right.

Eligibility for TIAA is extended only to employees of colleges, universities, private schools, and certain other nonprofit educational or scientific organizations, and to the spouse of such an employee when more than half of the combined earned income of husband and wife is from a qualifying institution.

Established as a Nonprofit Service Organization by the Carnegie Foundation for the Advancement of Teaching

2 OCTOBER 1981
VERSATILITY

The SAM is easily connected to an HPLC and supplied with reagents in top-mounted reservoirs. Removal of the finished product and reconversion of the HPLC to an analytical instrument is accomplished in minutes.

Custom synthesized oligonucleotides are available in a variety of phosphite and phosphotriester chemistries. The SAM may also be quickly adapted to peptide synthesis as well as any number of new chemistries.

Complete Automation

All steps of the synthesis of the oligonucleotides are performed automatically by the module. The phosphite method cycle time is 30 minutes.

CUSTOM SYNTHESIS OF OLIGONUCLEOTIDES

Because of recent technological advances in the automated synthesis of nucleotides, BIOSEARCH is able to offer the rapid and accurate synthesis of custom oligonucleotides.

<table>
<thead>
<tr>
<th>Length of nucleotide</th>
<th>$/1 OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>600</td>
</tr>
<tr>
<td>6</td>
<td>800</td>
</tr>
<tr>
<td>8</td>
<td>1000</td>
</tr>
<tr>
<td>10</td>
<td>1400</td>
</tr>
<tr>
<td>12</td>
<td>1800</td>
</tr>
<tr>
<td>14</td>
<td>2300</td>
</tr>
<tr>
<td>15</td>
<td>2500</td>
</tr>
</tbody>
</table>

Sequence verified by Maxam Gilbert
Three week delivery time
Large quantities or longer sequences available
Nonstandard sequences with modified bases available

COMPLETE LINE OF NUCLEOTIDE CHEMISTRY PRODUCTS at new modest prices

- Protected nucleosides
- Protected nucleotides
- Dimers
- Linkers/Adapters
- Coupling reagents
- Derivatised resins for solid phase synthesis
- All other reagents necessary for solid phase or solution synthesis

Included in the selection are:

<table>
<thead>
<tr>
<th>Protected nucleosides</th>
<th>$/gm</th>
<th>$/5 gm</th>
<th>$/100 gm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMT-da-(N-Bz)</td>
<td>60</td>
<td>250</td>
<td>4000</td>
</tr>
<tr>
<td>DMT-dC-(N-Bz)</td>
<td>70</td>
<td>260</td>
<td>4900</td>
</tr>
<tr>
<td>DMT-dG-(N-iBu)</td>
<td>80</td>
<td>300</td>
<td>4800</td>
</tr>
<tr>
<td>DMT-dT</td>
<td>45</td>
<td>170</td>
<td>2800</td>
</tr>
</tbody>
</table>

Blocked triester monomer kit
500 mg of each of 4 blocked monomers as TEA salts
Dimer kit
100 mg of each of 16 blocked dimers as phosphate TEA salts

The SAM will be available in late fall, 1981, for $10,800. Blocked nucleosides for a 15mer cost approximately $300. A stand-alone synthesizer will also be available.
Photomicroscope III
There's still nothing like it!

The 35mm camera is built in
The schematic below shows why the Zeiss Photomicroscope is unique: it contains a completely integrated, fully automatic 35mm camera. You get great convenience in a compact and uncluttered microscope. The tube head is free to accept auxiliary documentation and observation equipment as well as photometers.

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Start with the optics. 137 objectives...Achromats, Planachromats, Neofluars, and the unmatched Planapochromats, which, along with the unique multiple-immersion, high-numerical-aperture Plan Neofluars, are ideal for brilliant fluorescence microscopy, too. From object to image, everything you need for every technique in transmitted and reflected light.

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Photomultiplier for integrated and spot reading in real time
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Film cassette with heavy-duty automatic film advance and optional data recording
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4-position prism cluster
Optovar magnification changer and centering telescope
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Choice of 17 stages
Quick release, stage and substage mounts
Meter for integrated voltage control
Exposure time indicator

ASA setting for all available film materials
Control and warning light
Integrated automatic shutter release (time and bulb exposure on opposite side)
6 filter selectors
Widest choice of illuminators

114
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SCIENCE, VOL. 214
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The EC500...2,000 volts...$1,195

The EC400...1,000 volts...$895

If you're doing advanced separations work, dependable power supply ought to be the least of your problems.

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The EC500, at $1,195, gives you up to 2,000 volts maximum voltage—a must for highest resolution in techniques such as isoelectric focusing. Maximum current is 150 mA and maximum power is 300 watts.

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A product of the Separations Specialists.

*also available with Voltage Limit Control as EC400VL...$995
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AAAS National Meeting 3-8 January 1982
Washington, DC
New packaging, new sensitivity, new binding affinity... Or just downright new.

**New for Neurofunctional Mapping**

Aqueous packaging for added convenience

More efficient labeling than 2-deoxy-D-glucose
2F-DG has been shown to be transported more rapidly into brain cells, and more slowly removed than 2-DG. Thus it builds up to higher concentration in the cell, making more efficient use of label than 2-DG.

Establish metabolic similarities between 2F-DG and 2-DG

Deoxy-2-fluoro-D-glucose, 2-[14C(U)]-
300-600mCi/mmol NEC-757 Ethanol:water, 9:1 NEC-757A Sterile aqueous solution 50μCi 250μCi 1mCi

Deoxy-2-fluoro-D-glucose, 2-[5,6-3H]-
25-50Ci/mmol Sterile aqueous solution NET-702 250Ci 1mCi 5mCi

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**NEAREST Protease Substrates**

Improved assay sensitivity: Reaction volumes of ≤25μl conserve substrate and enzyme

Low background, ease of assay: Labeled cleavage product is preferentially soluble in organic solvents

Benzoyl-L-prolyl-L-phenylalanyl-L-arginylanilide, [aniline-14C(U)] - Plasma and glandular kallikrein substrate NEC-758

Benzzyloxy carbonyl-glycyl-L-prolyl-L-arginylanilide, [aniline-14C(U)] - Thrombin and plasmin substrate NEC-774

Toluene-sulfonyl-L-arginine methyl ester, p-[methyl-3H]- (TAME) - Broad spectrum substrate for serine (trypsin-like) proteases. Highest specific activity available NET-717

Benzoyl-L-arginine ethyl ester hydrochloride, α-N-[ethyl-2-3H]- - Broad spectrum substrate used to measure human thrombin, enterokinase, trypsin, and acrosine NET-718

Also:

Casein, [methyl-14C]-methylated NEC-735
Collagen, [3H]- (Rat Type I) NET-660 Collagen, [methyl-14C]-methylated (non fibril forming) NEC-729 Methemoglobin, [methyl-14C]-methylated NEC-728 Protein, [14C(U)]-(E. coli) NEC-737

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**Avidin-EGF-Gelatin**

High biotin binding affinity

Avidin, [125I]-
30-60μCi/μg Shipped frozen in 0.05M sodium phosphate buffer (pH 7.4) NEC-164 10μCi 2x10μCi 50μCi 2x50μCi

Tested for binding and displacement in RIA

Epidermal growth factor, [125I]-
150-200μCi/μg Lyophilized from sodium phosphate buffer (pH 7.4) NEC-160 10μCi 2x10μCi 50μCi 2x50μCi

High fibronectin binding affinity

Gelatin, [125I]- (porcine)
5-10μCi/μg Lyophilized from sodium phosphate buffer (pH 7.4) NEC-156 100μCi 500μCi

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**Latest Neuropeptides [125I]**

Adrenocorticotropic hormone, [125I]- (human) (ACTH)
>30μCi/μg Lyophilized from phosphate buffer (pH 3.5) containing a stablizer and proteolytic enzyme inhibitor NEC-165 10μCi 2x10μCi 50μCi 2x50μCi

Substance P (8-L-tyrosine), [125I]-
>500μCi/μg Lyophilized from sodium carbonate (pH 9.9) containing bovine serum albumin NEC-152 10μCi 2x10μCi 50μCi 2x50μCi

Bradykinin (8-tyrosine)-triacetate, [8-tyrosyl-125I]-
>500μCi/μg Lyophilized from 0.075M ammonium acetate buffer (pH 5.0) NEC-097 10μCi 2x10μCi 50μCi 2x50μCi

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Not for use in humans or clinical diagnosis.

**New England Nuclear**

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Washington, DC

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Science Film Festival
Poster Sessions
Tours
Youth Activities

For details about the Meeting program, as well as housing and registration forms, see the Preconvention Program issue of Science, 30 October 1981.

or write

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1776 Massachusetts Avenue, NW
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Washington, D.C. 20036

AAAS Annual Meeting and Exhibit
Washington, D.C.
3-8 January 1982

John F. Kennedy Center for the Performing Arts
THE FIRST ANNUAL CONGRESS FOR
HYBRIDOMA RESEARCH
15-17 FEBRUARY, 1982, LOS ANGELES, CALIFORNIA
THE BILTMORE HOTEL
CO-CHAIRMEN
ZENON STEPLEWSKI • HILARY KOPROWSKI
WISTAR INSTITUTE, PHILADELPHIA, PENNSYLVANIA

The FIRST CONGRESS ON HYBRIDOMA RESEARCH has been organized by SCHERAGO ASSOCIATES, INC. and the Journal, HYBRIDOMA and GENETIC ENGINEERING NEWS. (Published by Mary Ann Liebert Publishers, Inc.)

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Speakers:
Dr. Latham Claffin; University of Michigan, Ann Arbor, Michigan, USA
Dr. Leroy Hood, California Institute of Technology, Pasadena, California, USA
Dr. Malcolm Getler; Massachusetts Institute of Technology, Boston, Massachusetts, USA
Dr. Brian Clevinger; Washington University, St. Louis, Missouri, USA

SYMPOSIUM II: TERMINAL DIFFERENTIATION
Chairman:
Dr. Giovanni Rovera; The Wistar Institute, Philadelphia, Pennsylvania, USA
Speakers:
Dr. J. Thomas August; John Hopkins University, Baltimore, Maryland, USA
Dr. Barbara Knowles, The Wistar Institute, Philadelphia, Pennsylvania, USA
Dr. Cox Terhorst, Harvard Medical School, Boston, Massachusetts, USA
Dr. Melitta Schachner; Universitat Heidelberg, Heidelberg, Federal German Republic

SYMPOSIUM III: ANTIGENS OF INFECTIOUS AGENTS
Chairman:
Dr. Michael B.A. Oldstone; Sctipps Clinic and Research Foundation, La Jolla, California, USA
Speakers:
Dr. Luc Perrin; Hospital Cantonal, Geneva, Switzerland
Dr. Walter Gerhard; The Wistar Institute, Philadelphia, Pennsylvania, USA
Dr. Michael J. Buchmeier; Scripps Clinic and Research Foundation, La Jolla, California, USA
Dr. Dwight Lopes; The Wistar Institute, Philadelphia, Pennsylvania, USA

SYMPOSIUM IV: ONCOFETAL ANTIGENS
Chairman:
Dr. Richard Metzgar; Duke University, Durham, North Carolina, USA
Speakers:
Dr. Richard Metzgar; Duke University, Durham, North Carolina, USA
Dr. Zenon Steplewski, The Wistar Institute, Philadelphia, Pennsylvania, USA
Dr. Barton Haynes; Duke University, Durham, North Carolina, USA
Dr. Jean-Pierre Mach; Ludwig Institute for Cancer Research, Lausanne, Switzerland

SYMPOSIUM V: T CELL HYBRIDOMAS, HUMAN HYBRIDOMAS
Chairman:
Dr. Fritz Melchers; Basel Institute for Immunology, Basel, Switzerland
Speakers:
Dr. Henry S. Kaplan; Stanford University, Stanford, California, USA
Dr. Carlo Croce; The Wistar Institute, Philadelphia, Pennsylvania, USA
Dr. Tadamitsu Kishimoto; Osaka University Hospital, Osaka, Japan

Scientists interested in presenting poster papers may obtain abstract forms from Zenon Steplewski, Wistar Institute, 36th & Spruce, Philadelphia, PA 19104.

Regular Registration: $275 (includes Banquet and Subscription to the Journal, HYBRIDOMA)
Student Registration: $175 (includes Banquet only). Must be verified in writing by Department Head.

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30 OCTOBER 1981 491
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Never before has there been an instant film with the sensitivity of Polaroid’s new Type 612 Ultra High-Speed Instrument Recording Film.

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It all adds up to a new film designed for high-speed oscillography, metallography, and dozens of other instrumentation and high technology applications.

For example, Type 612 is so sensitive, oscillographers can record events down to less than 5 nanoseconds. Metallographers can use its high contrast properties to distinguish incredibly subtle details.

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Washington, D.C. 20036

AAAS Annual Meeting and Exhibit
Washington, D.C.
3-8 January 1982

John F. Kennedy Center for the Performing Arts
A bird watcher’s guide to Amoco’s environmental efforts.

The harmonious coexistence of the energy industry and the natural environment is being proved at Amoco’s Casper, Wyoming refinery. Biological management has turned a waste water pond into the state’s most prolific habitat for birds and other wildlife. The refinery’s fresh water effluent has decreased the pond’s alkali content from 20,000 parts per million to 7,000. This remarkable improvement in water quality has created an ecosystem that supports more ducks and geese than anywhere else in the state.

The Audubon Society monitors the pond and now catalogs a wide variety of bird species—including grebes, geese, eagles, swans, and the rare Sabine’s Gull—not found in the area before construction of Amoco’s refinery.

This Wyoming wildlife habitat is a real example of how Amoco can supply energy to help meet America’s needs while preserving the environment.

You expect more from a leader.
Reddy Chirra improves his vision with an Apple.

Reddy is an optical engineer who’s used to working for big companies and using big mainframes.

But when he started his own consulting business, he soon learned how costly mainframe time can be. So he bought himself a 48K Apple II Personal Computer.

And, like thousands of other engineers and scientists, quickly learned the pleasures of
VAX Vouchers

Guaranteed 43% return on investment.

It's a flood. It began in 1978 and has been rising ever since. The flood is software packages for the VAX computer family. There are a few good values among them—but watch out. There are also a lot of duds, especially among data-base management software.

You may already have one of these DBMS's installed on your VAX computer. If you do, you're familiar with some of their many problems: poor documentation, slow execution times, and limited data-base functionality. Above all, you also see user-level features that remind you of the early days of interactive computing.

The cause of these problems is easily explained. Soon after DEC announced the VAX, several companies noticed a great opportunity and rushed to market with their DBMS software. Some of them quickly converted their products to the VAX from other hardware. A few others took their academic research projects and tried to make them viable commercial products. If only good data-base software could be created so easily!

We took a fresh approach. Our years of experience in commercial data-base systems taught us what we and other companies had done well and had done poorly. VAX users in the 1980's, we reasoned, deserved and wanted better than the software flaws of the 1970's. So we decided to design and implement a completely new data-base system. We hired a team of experienced software designers and documentation writers. And we spent three solid years designing and documenting our software from the ground up.

In 1982, you will see the results of our work—a DBMS for the 1980's. Whether you're a research scientist, a corporate executive, or a novice, you can immediately use our DBMS productively from your terminal. Even in the middle of a command, you can access our online documentation without opening our user manual. If you're a programmer, you can also use our DBMS from any language that supports the VAX/VMS procedure-calling standard—languages such as FORTRAN, COBOL, MACRO, BASIC, and PASCAL. And we have not sacrificed performance for usability. We exploited the unique architecture of the VAX to give you the fast execution times and throughput that will not appear in other software for years to come.

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We want to avoid these expenses, and we will pass on most of our savings to you.

OUR UNIQUE OFFER

If you own a VAX computer, or if you have one on order, send us the coupon below. This puts you on our exclusive and confidential mailing list. We will keep you posted on the progress of our software development and testing. Then three weeks before we formally announce and release our DBMS, we will send you the announcement with our descriptive literature.

But that's not all. In exchange for your coupon, we will send you a voucher worth $12,000 towards the purchase of our software. That's right—$12,000! The voucher, without exception, will pay $40,000 for our DBMS software. With a voucher, you will spend only $28,000 for software worth at least $40,000—a respectable return on investment of 43% in these inflationary times.

When we release our DBMS, you will have at least six weeks to test it, at no charge, on your VAX computer. Compare and benchmark its speed and flexibility against other software that you already have or are considering for purchase. Decide risk-free whether indeed it is worth its $40,000 price, let alone your low price with your voucher.

The voucher comes with your company's name on it and it is not transferable. Therefore, the information that you list on the coupon must be accurate and complete. The voucher expires two months after we formally release our software, so you will have to act promptly when we notify you of the release date.

Of course, we may still spend some money to market our software to those of you who do not respond to our voucher offer. But by that time, we hope to have quite a large mailing list as a result of this advertisement, so we will have to advertise very little.

We have chosen to remain anonymous until we release our DBMS. Otherwise your many telephone inquiries would seriously distract us from our development work. We also want to test our marketing concept and prove that VAX owners are value-conscious in their software selection. Despite our anonymity, we can assure you that we are a respected company with substantial assets and an excellent reputation for software expertise and customer service.

The DBMS software for the 1980's is almost here. Participate risk-free in its exciting release. Send in your coupon with no obligation, today.

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□ Operating system (circle one): VMS, UNIX, other.
□ We have ______ VAX 11/780's and ______ VAX 11/750's installed.
□ We have ______ VAX 11/780's and ______ VAX 11/750's on order.
□ I have none installed and none on order, so I am not eligible to receive a VAX Voucher, but please put me on your mailing list anyway. My hardware is ______

VAX Vouchers

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Put wavy bands where they belong.
Among yesterday's problems.

Banish wavy bands with Ultrophor, a unique new instrument designed exclusively for professional electrofocusers by LKB, electrofocusing pioneers since 1960.

The ultracompact Ultrophor will cope with any analytical or preparative electrofocusing situation thanks to its radically new approach to electrode design, the construction of the highly efficient glass/aluminum cooling plate and the opportunity for atmospheric control.

The impressive list of bonuses include the flexibility of being able to run gels of any length up to 26 cm long or gels of any thickness, especially capillary-cast ultrathin gels, with less chance of wavy or skewed bands. The Ultrophor also has an unmatched capability to run high pH gels for sharp separations of alkaline samples as well as handle oxygen-sensitive or other labile samples.

Not only do you save valuable lab space with the compact Ultrophor but you save on time too because it's so fast and convenient to use and super-easy to clean. Like all LKB units, the new Ultrophor boasts a complete backup system and comprehensive technical support.

Contact your nearest LKB representative today for full information.

Ultrophor – the straight choice for professional electrofocusers.

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How to break the $^{32}$P habit and regain control of your schedule.

$^{35}$S-Nucleotides

ATP-$^{35}$S GTP-$^{35}$S dATP-$^{35}$S ATP-$^{35}$S

The traditional probe for nucleic acid studies has been $^{32}$P, one good reason being its high initial specific activity. However, within a short time that advantage dissipates because of $^{32}$P's short half life, and the benefits of using $^{35}$S in the first place become very persuasive.

To take advantage of these benefits, NEN has developed $^{35}$S-nucleotides for nucleic acid studies. Primarily they introduce versatility and convenience compared to $^{32}$P. They also reduce waste and involve the user with less radiation exposure.

**Biological activity** — These nucleotides have phosphate replaced by $^{35}$S-thiophosphate in the $\alpha$ or $\gamma$ position. They are biologically active and each may be substituted freely for its natural analog with a variety of enzymes (DNA or RNA polymerase, protein kinase, etc.). However, these compounds and probes prepared from them are resistant to phosphatases and nucleases at the point of thiophosphate substitution, making possible new experiments and techniques.

**Longer lived probes** — Since $^{35}$S has six times the half life of $^{32}$P (87 vs. 14 days), you'll need to make your labeled probes much less often, leaving yourself more time for research. Also there'll be less waste and less expense.

**High specific activity** — All $^{35}$S-nucleotides are available from NEN at specific activities approaching 500Ci/mm mol. Even more important, the useful specific activity will be maintained longer by nucleic acids and proteins because of $^{35}$S's longer half life (see diagram).

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About a year ago, Xerox introduced the Ethernet network—a pioneering new development that makes it possible to link different office machines into a single network that’s reliable, flexible and easily expandable.

The following are some notes explaining the technological underpinnings of this development. They are contributed by Xerox research scientist David Boggs.

The Ethernet system was designed to meet several rather ambitious objectives.

First, it had to allow many users within a given organization to access the same data. Next, it had to allow the organization the economies that come from resource sharing; that is, if several people could share the same information processing equipment, it would cut down on the amount and expense of hardware needed. In addition, the resulting network had to be flexible; users had to be able to change components easily so the network could grow smoothly as new capability was needed. Finally, it had to have maximum reliability—a system based on the notion of shared information would look pretty silly if users couldn’t get at the information because the network was broken.

Collision Detection

The Ethernet network uses a coaxial cable to connect various pieces of information equipment. Information travels over the cable in packets which are sent from one machine to another.

A key problem in any system of this type is how to control access to the cable: what are the rules determining when a piece of equipment can talk? Ethernet’s method resembles the unwritten rules used by people at a party to decide who gets to tell the next story.

While someone is speaking, everyone else waits. When the current speaker stops, those who want to say something pause, and then launch into their speeches. If they collide with each other (hear someone else talking, too), they all stop and wait to start up again. Eventually one pauses the shortest time and starts talking so soon that everyone else hears him and waits.

When a piece of equipment wants to use the Ethernet cable, it listens first to hear if any other station is talking. When it hears silence on the cable, the station starts talking, but it also listens. If it hears other stations sending too, it stops, as do the other stations. Then it waits a
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