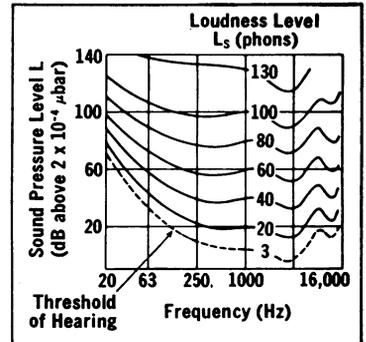




frequencies and loudness levels. Although there is a small variation from person to person, normal ears agree within a few dB with the plot reproduced here (ISO Recommendation 226).

An even more significant peculiarity of the ear is its response to the pitch and bandwidth of a noise. Broadband sounds, like those of jet aircraft, seem much louder than narrow-band noise of the same sound pressure level. Thus accurate loudness measurements can be made only by taking into account the spectral distribution of the sound and relating it to empirically determined



critical bandwidths. This phenomenon has given rise to the *Bark* scale: the audio range comprises 24 Bark, each of which equals the ear's critical bandwidth at a given center frequency.

Probably the most significant difference between objective and subjective measure of loudness occurs when two sounds are presented to the ear simultaneously. If the two sounds are widely separated in frequency, their partial loudnesses simply add to form the total loudness. But if they are not separated by a critical bandwidth, one sound masks the other: the closer together, the greater the influence. The noise analyst expresses this characteristic quantitatively in terms of *loudness density*, in sones/Bark.

The HP 8051A Loudness Analyzer is, in effect, a calibrated electronic ear that takes all of these subjective reactions of the human ear into consideration in measuring loudness based on ISO Recommendation 532 (Zwicker's Method). It listens to sound through a calibrated microphone or tape recorder, automatically produces a continuous spectral analysis and displays it as a plot of loudness density vs. subjective pitch. The instrument also computes and displays the total loudness of the sound, that is the integral of the Zwicker diagram.

The instrument is a great help in noise abatement studies because it shows how noise reduction techniques can be applied most effectively. Its spectral analysis points the finger at the most obvious sound-producing component, suggests what kind of sound-absorbing material may be needed, offers quick *before* and *after* comparisons of noise abatement programs.

A much more complex and versatile instrument for audio spectrum analysis, the recently announced HP 80501A Audio Data Processor combines the equivalent of a Loudness Analyzer with a powerful HP 2115A Digital Computer. The 80501A measures loudness with Kryter, Stevens, TALARM, SAE or dB weightings depending on the choice of standard computer programs. Results are available immediately: for example, the 80501A yields a complete analysis of aircraft noise while the plane is still overhead.

Our new 116-page Acoustics Handbook does justice to this rather complex subject. For your copy, write to Hewlett-Packard, 1505 Page Mill Road, Palo Alto, California 94304. In Europe: 1217 Meyrin-Geneva, Switzerland.

HEWLETT  PACKARD

ANALYTICAL INSTRUMENTS

We want to be useful ...and even interesting

Subject failure



A man who would never dare pull out snapshots of his beautiful grandchildren can, under certain agreeable circumstances of contact with peers, make good communication use of color snapshots that illustrate some noteworthy aspect of subjects whose beauty and wonder only a fellow specialist would fully appreciate.

Though the percentage of KODACOLOR Prints so used is small, we consider this use important. One of the fine things about KODACOLOR Prints is their modest price. This is made possible by vast numbers of people who *do* dare to pull out snapshots of their grandchildren and of happy events in their

lives. A certain predictability in such pictures detracts nothing from their acceptability. On the contrary, it helps by providing valid statistics for automatic adjustments in the print-exposing equipment to raise still higher the incidence of satisfactory color balance in the resulting snapshots.

The machinery that judges each negative understands perfectly that Grandma wants justice done to her green dress, but it is too stupid to know that three very light green larvae, occupying less than 5% of the expanse of the dark green leaf in another picture, are the sole reason *that* picture was taken. So it does a grand job of exposing for the leaf background, while the underexposed larvae lose the delicate color that had excited the photographer.

Here is a choice of ways to beat this subject failure:

1. Set up to make your own color prints. You know what you want. There is much satisfaction in bringing it forth with your own hands.

2. A custom color lab that serves professional photographers can accept your highly detailed instructions on each negative. They will be carried out by an operator who is far from stupid. He deserves good pay for his patience.

3. Save needless fuss and expense by sticking to KODACOLOR Prints, but take a moment to think how you can fool our stupid machinery into working for you instead of against you. **If only a small part of the picture is to carry the subject of interest, don't let something very much darker or lighter constitute much of the rest of the negative.**

Hi, all you molecular biologists out there!

For success in riveting attention to the respective merits of various detergents, the American economy has long reserved some of its richer material rewards. Never mind why. It is so.

Here now we seek attention to the very special detergent, Tri-iso-propylnaphthalenesulfonic Acid Sodium Salt. You'll love the way it teams up with phenol and m-cresol to ease the task of extracting clean RNA from animal and vegetable ribosomes. Now you can use a medium that inhibits nucleases at the same time it prevents release and shearing of DNA!

While the importance of this detergent in molecular biology cannot, perhaps, be overemphasized, we can sure try.

Secret envy of the cleanliness attained by others in *their* extractions need no longer gnaw at the vitals. First news of the boon appeared in *Biochem. J.* 96:266 (1965): "Tri-iso-propylnaphthalenesulphonate is a suitable detergent, as it can be used with phenol in a greater concentration than dodecyl sulphate without forming a single-phase system." This fits in

with a two-stage extraction found essential for stable RNA. A phenol-cresol mixture outperforms phenol alone as a de-proteinating agent. In the first stage, DNA is left at the phase interface. The second cleanses most protein from the aqueous phase and prevents precipitation of the remainder by m-cresol.

In *Nature* 215:363 (1967) read how this miracle detergent in combination with the polyacrylamide-gel disk electrophoresis technique, which we helped promote to the world for protein resolution, has distinguished cytoplasmic RNA in plants from bacterial and mammalian RNA and has led to the suggestion that chloroplasts evolved from symbiotic blue-green algae!

Ask for it as Tri-iso-propylnaphthalenesulfonic Acid Sodium Salt. Ask for it as EASTMAN P3513, but ask for it. Ask B&A / CURTIN / FISHER / HOWE & FRENCH / NORTH-STRONG / PREISER / SARGENT-WELCH / WILL. We have two unpublished testimonials from unimpeachable sources that this grade works fine in this application without further purification.



KODAK Infrared Scope: A 21-ounce, 1.1X telescope for observing infrared emission or for seeing by infrared illumination. Peak response at 800 nm, 90% of peak at 700-900 nm, total sensitivity range 400 to 1200 nm. Objective can be focused from one foot to infinity. Field of view 26°. Resolves at least 5.5 minutes through focusing eye-

piece on viewscreen of its green-emitting image converter. Built-in power supply delivers 12,000 volts from a 1.34-v mercury battery. We buy these metasopes in quantity for resale to photofinishers, who use them for darkroom chores under infrared safelight.

If you too need one, Department 927, Eastman Kodak Company, Rochester, N.Y. 14650, can provide a current estimate of how much change to expect back from \$1,000.