

DOTS

or

Complexity is no longer objectionable

It began to happen quite recently. Engineers, realizing that the mythical mind of the well-programmed and capacious digital computer does not boggle, put it to work translating mind-boggling complexities of logic into physical form. The ancient philosophers who invented logic as a game that is all in the mind had perhaps never actually encountered minds that do not boggle. To put logical constructs into a physical form that is readily multiplied, one turns to a craft generally credited to Gutenberg. The particular physical form, whether a metal-oxide-semiconductor (MOS) chip, a bipolar integrated circuit, or a charge-coupled device (CCD), rests also on subsequent contributions by the artists who invented photography, by the inorganic chemists who vied to discover new elements in rocks, by the physicists who invented quanta and electrons to explain their experiments, by the organic polymer chemists, even by us in one small way or another.

The physical form comes down to a bit of jewel patterned in lines and dots much finer than those by which a printing press prints pictures. The scanning electron microscope discloses thousands of electronically active and passive components tied together by logic. Economies of duplication and

size for costly materials of the rarest purity open mass markets for all manner of artifacts that interact with the customer's central nervous system, homunculi who live in tiny boxes and are looking for new work beyond telling time and performing difficult calculations. When complexity is affordable, one can do almost anything.

The technology that generates the dots for the printing press turned out to be the way to carve and deposit the patterns the computers generate. From serving the printing and graphic arts industry for a long time, we know that technology well and currently serve the photolithographic departments of today's electronics industry not only with high-resolution plates and light-sensitive resists but by encouraging communication within their craft.

Here, for example, are the titles of papers presented at the most recent of the Kodak Microelectronics Seminars:

The "Oxygen Effect" in Photoresists and Its Manifestation in Processing Parameters

A Laser Reticle Generator

Performance of an EBP (Electron Beam Pattern Generator) as a Link in a Semiconductor Chip Manufacturing Chain

Mechanistic Aspects of Photocrosslinking in Negative Photoresists

Modelling Positive Photoresist

An Electrical Method for Detecting Pinholes

Effective Water Removal from High-Resolution Plates

Advances in Contact and Proximity Printing

Holographically Prepared Gratings for Integrated Optics

Chrome Is for Car Bumpers and LSI Mask Technology

The Characterization of Positive Photoresists

Processing Techniques

The Chemistry and Control of Processing High-Resolution Plates

Lenses and Optical System Used in Microelectronics

Monosubstituted Vinyl Polymers as Highly Sensitive Negative Electron Beam Resists

If any of them specifically interest you drop us a note at Dept. 55W, Kodak, Rochester, N.Y. requesting a copy.

To the biomedical reader:

Have Dept. 55Z at Kodak, Rochester, N.Y. 14650 send you the **Directory of KODAK Products and Services for the Health Sciences**. It guides you to products employed in the laboratory, in diagnosis and documenta-

tion, in teaching, in record management. Also to our vast array of literature on those uses of our products. You may find it more useful than the story about the dots.

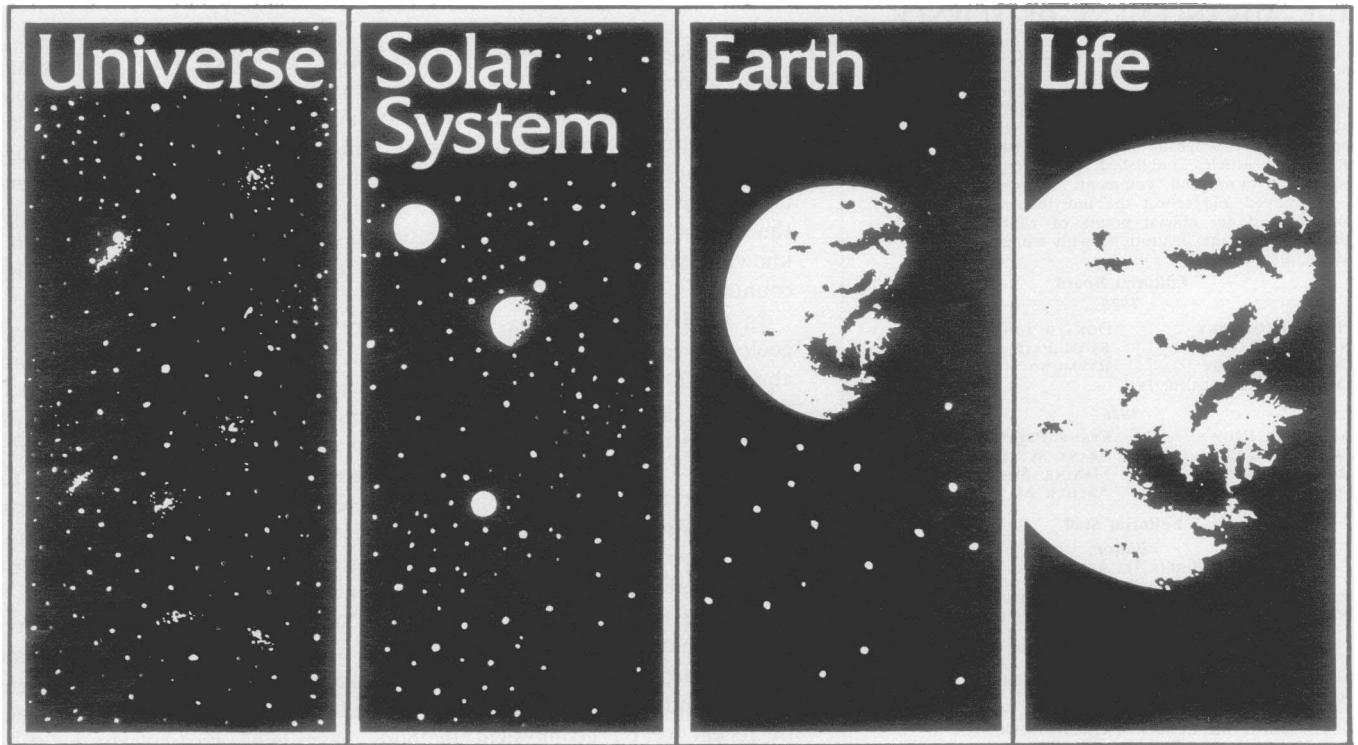


Origins:

Speculations and facts on the sources of planets,

Earth, and life by Robert Jastrow, Philip Morrison,

Cyril Ponnampерuma, George Wald.



What is man's deepest mystery? Perhaps it is his own origin and that of his world. How did life begin? Where? . . . How did primitive life evolve into man? . . . How did the earth form? . . . How was the universe created? . . . What of the genesis, life, and death of stars? . . . What do pulsars and quasars signify? How were elements created?

Four of the world's leading scientists probe these questions in ORIGINS. They talk of experiments that recreate the conditions for life . . . speculations on the forces of evolution . . . clues to life origins found in meteorites . . . the underlying order in the chaotic formation of stars and solar systems . . . the search for the true age of the earth.

The quest to understand our beginnings is an eternal one. We've used our intuition, our reasoning ability, and the steady accumulation of scientific tools to follow that quest. Through these four

talks, the listener learns how far we've come, what we now understand, and where we have to go.

ORIGINS is an attractive album with four 50-minute cassettes and an accompanying booklet. Ideas, facts, and speculations are given in layman's language—just as they were originally given in public lectures in Washington, D.C.

This album is ideal for the inquisitive mind that wants to understand the nature of stars, the universe, the earth, and life. For the science student, ORIGINS shows how scientific method and tools—those of chemistry, physics, astronomy and geology—can be applied to this basic mystery. And for everyone, ORIGINS is the opportunity to listen to scientific work-in-progress.

Price: \$34.95 to AAAS members.
\$39.95 to nonmembers.

DESIGN IN THE UNIVERSE
George Wald, Harvard University

TO THE THRESHOLD OF LIFE
Robert Jastrow, NASA Institute for Space Studies

THE ORIGIN OF LIFE
Cyril Ponnampерuma, University of Maryland

INTELLIGENT LIFE BEYOND THE UNIVERSE
Philip Morrison, Massachusetts Institute of Technology



AMERICAN ASSOCIATION for the ADVANCEMENT OF SCIENCE

Department O-2

1515 Massachusetts Avenue, N.W., Washington, D. C. 20005

Please send me _____ albums of ORIGINS at \$39.95 each (\$34.95 for AAAS members).

Check enclosed Please bill me later

(Member orders must be accompanied by remittance.)

Name _____

Address _____

City _____ State _____ Zip _____