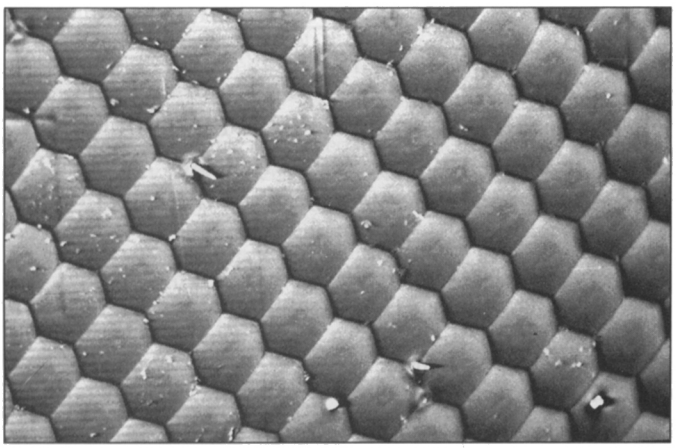
Eye of the Honey Bee Reminiscent of Fullerenes

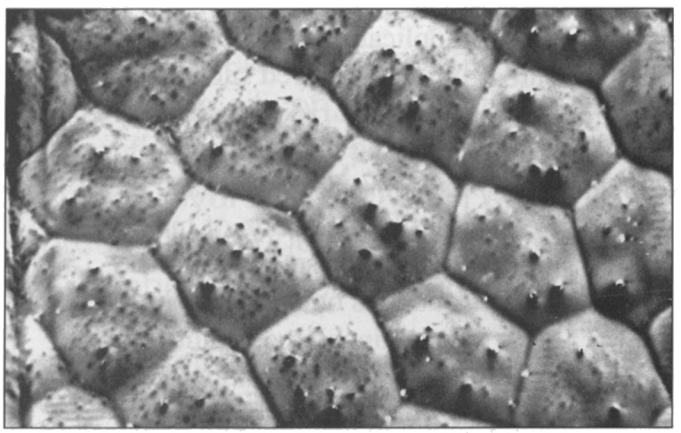
To the Editor:

In the article "Shape and Fantasy of Fullerenes" (November 1994, p. 33) the pine tree was given as an example of nature's utilization of the hexagon-pentagon principle. I have also found a very interesting example of this in the compound eye of the honey bee. Whilst imaging the eye on a scanning electron microscope I noticed that the flat and cylindrical areas of the eye contained a regular array of hexagons but when an image was taken at the corner of the eye, where the surface bends in two directions into a convex surface, pentagons can clearly be seen.

Janet Hopkins
Cheshire, England



The non-curved part of the honey bee's eye. Photo taken at Daresbury Laboratory, Daresbury, Warrington, Cheshire, England.



Corner of the honey bee's eye. Photo taken at Daresbury Laboratory, Daresbury, Warrington, Cheshire, England.

Science Fiction Stimulates the Imagination

To the Editor:

It was with personal regret that I read in the latest issue of the *MRS Bulletin* [February 1995, p. 68] that Kevin Anderson will no longer be contributing his article to [the Historical Note Department]. Although I joined the Materials Research Society more than 10 years ago, it was to be some time before I discovered "Historical Note(s)" at the back of their house periodical. But, before long, it became the one article that I read and enjoyed without fail. This note is only to say thank you.

Anderson's last article "Elements of Science Fiction" was a delightful way to end the series. I had never heard of Bob Shaw's "slow glass," but, like most good science fiction, it stimulates the imagination to ask "Why not?" Indeed, the problem of the first emergence of light after passing through an optical medium is by no means so simple as that for the steady behavior which is treated by the concept of "refractive index." No less illustrious names than Arnold Sommerfeld and Leon Brillouin have taught us that these are "rocky waters" whose navigation is best left to the best of skippers. Shaw has given us an interesting possibility to think about. But one cannot also avoid the feeling that "slow glass" is somehow a familiar thing. Only after I put the article down did I see the resemblance of "slow glass" to the human eyeball, retina and brain operating in the mode we call memory.

Louis R. Testardi
Florida State University

Editor's Note: While Kevin Anderson will no longer be writing Historical Note, we will continue the Department.

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Fusion Bonding
A Semiconductor Breakthrough

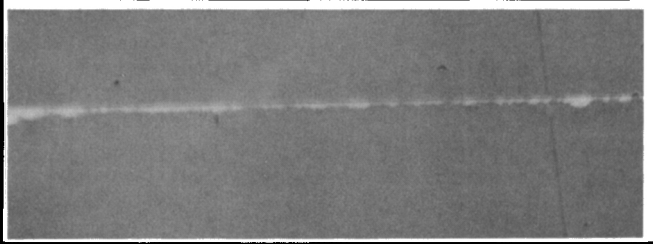
VIRGINIA SEMICONDUCTOR ANNOUNCES A NEW ERA IN SEMICONDUCTOR TECHNOLOGY

Dramatically improved from the "bond and etch" and "bond and polish back" days, Virginia Semiconductor, Inc. introduces a new era in bonding technology, with the advent of **Ultra Bond™**[1] silicon membranes. The benefits of **Ultra Bond™** will take semiconductor, MEMS, and SOI technology into the twenty-first century.

BREAKTHROUGH QUALITIES

Unique to this process is the use of separately manufactured silicon membranes and substrates. This ensures control on thickness uniformity and dopant concentration during production. These distinctive attributes are not altered during the fusion bonding process. Unlike other bonding techniques, the interface layer of **Ultra Bond™** evenly measures less than 2μ, and can be made with or without oxide.

[1]Patent Pending



A view of the beveled edge of **Ultra Bond™**, showing: the thin film layer, 37μ; the interface, 2μ; and the substrate.

EXCELLENT STRENGTH

The strength of **Ultra Bond™** products approaches intrinsic bond strength. It can withstand the misorientation induced stress caused by cleaving along one of the substrate's crystallographic axes. Also, it can be polished along the cleaved edge without flaking. VSI considers these strength qualities to be a minimum requirement for future device applications.

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* Aside from accumulation effects

SPECIFICATIONS & AVAILABILITY

Use of separately manufactured membranes and substrates allows for unlimited bonding combinations. The following outlines the selections available:

Diameter Range:	2"-4"
Top Thickness:	10μ -200μ
Resistivity:	Any Combination
Dopant:	Any Type
Order Size:	2 or More

FUTURE IMPACT

Ultra Bond™ will have a tremendous impact in optical, electrical, and mechanical applications. Never before has a product offered such an abrupt transition range, a steady resistivity and dopant concentration state, and the flexible selection of material types. These extraordinary qualities open up previously unattainable possibilities in the fields of semiconductor, SOI and MEMS technology.

To place an order, or to learn more about **Ultra Bond™** products, please telephone, fax or mail VSI today.

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FREDERICKSBURG, VA 22401
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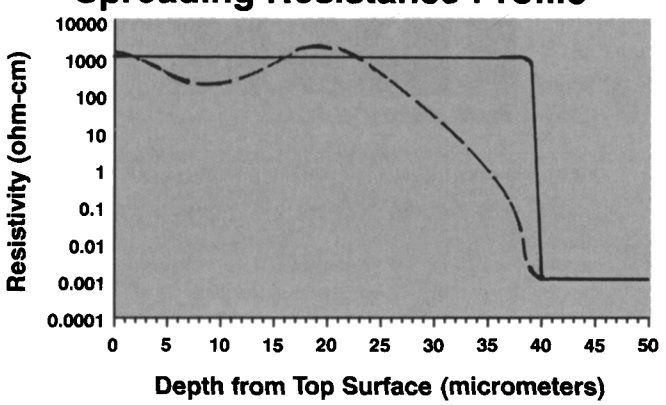
FAX: (703) 371-0371

Spreading Resistance Profile



This SRP illustrates the sharp electrical properties transition, <2μ, inherent in Ultra Bond™. Also, it shows that the resistivity of each layer is uniform.

____ Fusion Bonding

- - - - Epitaxial Silicon

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