lens fibers are approximately 7 microns wide and 4.5 microns thick in man, with some variation reported in other species.

Like the vertebrate lens, the octopus lens demonstrates a regular array of hexagonal cross-sections of elongated lens fibers in ultrastructural observations. Embryonic octopus lens were fixed in 2.5% glutaraldehyde, washed with sea water buffer with trace collidine, then post-fixed in 1% $OsO_4$ in the same buffer. Samples were embedded in Epon and sectioned at a later date. TEM examination of the Hawaiian crescent octopus at 36 days development showed hexagonal lens fibers of approximately 0.5 microns by 0.3 microns dimensions.

Although the lens fibers of the cephalopod eye are smaller than those in the vertebrate eye, the stacked array of hexagonal fibers makes the cephalopod lens a true crystalline lens. As in the vertebrate lens, this regular packing in the octopus lens may allow maximum strength in cell to cell contact and also may contribute to the transparency of the lens.

**DO THE IRIDOPHORES OF THE SQUID MANTLE REFLECT LIGHT OR DIFFRACT LIGHT IN THE PRODUCTION OF STRUCTURAL COLORS? Roger T. Hanlon, Kay M. Cooper,** The Marine Biomedical Institute, The University of Texas Medical Branch, Galveston and **Richard A. Cloney,** The Department of Zoology, The University of Washington, Seattle.

The dermis of squids contains complex cells called iridophores that lie beneath the chromatophore organs. It is well known that these cells produce structural colors upon interaction with light. The ultrastructure of iridophores has been described by several investigators, but it is not yet certain whether cells in the mantle of squids function as thin-film interference devices or as diffraction gratings. In the mantle of *Lolliguncula brevis* there are iridophores of several sizes and shapes. They all contain many ribbon-like iridosomal platelets and these are arranged within the cytoplasm into small parallel groups called iridosomes. The iridosomal platelets in most cells are generally oriented on edge and are therefore perpendicular to the surface of the epidermis. In other cells nearby, the platelets may be oblique or parallel to the surface. The orientation and organization of the platelets suggest that many cells may act as diffraction gratings because the light would usually strike the edges of the platelets. We have done preliminary experiments in which a beam of light was directed towards the iridophores in the dorsal mantle collar at an angle of 20° measured from the horizontal plane of the mantle. A camera was then used to record the resulting structural colors at progressively larger angles of observation. Observed colors were: red at 40°, red at 60°, orange-yellow at 80°, blue-green at 105°, blue at 120°. This progression from longer to shorter wavelengths is the exact order expected from half of the first order of diffracted light from a grating. In contrast, thin-film devices do not produce a spectrum of colors with a given angle of incident light, although the wavelength of reflection shortens with decreasing angle of incidence. We have planned several additional experiments to test the hypothesis that some iridophores behave as diffraction gratings.

**CUTTLEBONE MORPHOLOGY AND BATHYMETRY IN *SEPIA*. Peter Ward,** Department of Geology, University of California, Davis.

Recent experiments show that the cuttlebone of *S. officinalis* and *S. orbignyana* implode due to excess pressure at quite different depths. An analysis of cuttlebone morphology in approximately half of the known cuttlebone species indicates that cuttlebone morphological differences can be explained mainly as adaptations for different preferred habitat depths.

**CARBOHYDRATE CONSERVATION IN A CEPHALOPOD, *OCTOPUS DOFLEINI*. A. W. Martin** and **I. Deyrup-Olsen,** University of Washington, Seattle.

When carbohydrates were given to octopuses intravenously, a long time was required for the urine concentration to reach the blood level (Harrison and Martin, 1965. *Journal of Experimental Biology* 42:71–98). This was attributed simply to a slow rate of regulatory processes, but further investigation reveals at least two mechanisms of probable physiological significance.

Measurements of the distribution of isotope labelled dextrans and inulin through the body organs confirms earlier measurement of the blood (5.8% of body weight) and extracellular fluid (28% of body weight) volumes, but shows that some tissues accumulate both dextrans (up to 79% of blood level) and inulin (up to 130% of blood level) at levels considerably in excess of the average body organ concentration. The mechanism is considered to be a lectin-based activity by the branchial hearts, kidneys and gills, in that decreasing order. The mechanism is probably a generalized defensive one as Kowalevsky (1894. *St. Petersburg Academy of Sciences Bulletin* 36:273–295) showed a concentration of pathogenic bacilli by octopus branchial hearts, and Bayne (1973. *Malacological Review* 6:13–17) has shown a concentration of non-pathogenic bacteria in octopus gills.

The second mechanism, active uptake of glucose, was shown by using isotope labelled 2-deoxyglucose. In this case the branchial heart tissue took up glucose much more rapidly than any other tissue, thus reducing the amount of glucose that could reach the urinary filter, the branchial heart appendages. The kidneys and gills also showed greater activity in this respect than other organs. At these sites of possible loss of glucose from the body the mechanisms of glucose accumulation have been carried much farther than in the average tissue.

**ESCAPE BEHAVIOR OF *ROSSIA PACIFICA* BERRY, 1911. Ronald Shimek,** Bamfield Marine Station, British Columbia, Canada.

*Rossia pacifica* exhibits a stereotyped flight response consisting of four major behavioral cycles. A) Take-off, consisting of unburying from the sediment; accomplished by use of lateral fins and arms. B) An ink-jet repetitive cycle consist-