

Human Eye More Acute Than Bee's

Optics—Physics

The first scientific determination of the acuteness of vision of a bee is but one of the interesting topics described at the recent joint meeting at Columbia University, New York City, of the Optical Society of America and the American Physical Society, and reported below.

The eye of a bee is not nearly such a wonderful organ of sight as many romantic naturalizers would have us believe. It is, in fact, only about one per cent. as good as the eye of a human being when it comes to distinguishing separate objects and the distances between them. At the joint meeting of the American Physical Society and the Optical Society of America, Prof. Selig Hecht and Dr. Ernst Wolf, of Columbia University, told of experiments which established the degree of visual acuity of the bee.

They let bees walk up a sloping glass plate, beneath which was a moving slide with alternating dark and bright bands, giving a sort of picket-fence effect. The bee would change the direction of its march when it saw the bright bands moving, and it paid no attention to bands that were too narrow for it to see. By using a number of slides, with vary-

ing widths of bands, it was possible to find the narrowest object which a bee can perceive. This was found to be a hundred times as wide as the narrowest object a human being could perceive at the same angular distance.

Bee and human eyes were found to be alike in that both see badly in a dim light and better in a bright one. Above a certain degree of brightness, however, no improvement in sharpness of vision could be discovered.

Winter Lacks Ultra Violet

Winter sunlight is not only less intense than that of summer, but contains less of the sun-burning ultraviolet waves, Dr. Arthur D. Riddle of the Hegan Memorial Research Laboratory announced.

Sunburn and the other biological effects of ultraviolet rays are produced by a certain band of wavelengths, not longer than 1/78,000 inch and not shorter than 1/86,000 inch, approximately. As the length of the shortest waves in sunlight is some place between these figures, Dr. Riddle made measurements of the limit at

different times of the year, on both clear and cloudy days.

His results show that June sunlight, in both clear and cloudy weather, contains shorter waves than even clear December weather. In June, on both clear and cloudy days, waves as short as 1/84,300 inch were present. On a clear December day, the shortest were 1/82,300 inch, while on a dull day no waves shorter than 1/81,800 inch were detected.

New Cell May Aid Television

A new form of photoelectric cell, for converting light waves to electric impulses, using the metal caesium, instead of potassium, may prove of value in television because its response is more similar to that of the human eye. The new cell was described by V. Zworykin and E. D. Wilson, of the Westinghouse Electric and Manufacturing Co.

It has been known for some time that caesium offers a number of advantages for use in photoelectric cells, said Mr. Zworykin. The difficulties of handling pre- (Turn to next page)

First-Born Are Problems

Orthopsychiatry

The first-born child in a small family is more apt than any of his brothers and sisters to have such emotional and mental difficulties as to put him in the class of problem children. At least such children present problems to child guidance clinics more frequently than other children from small families, reported Dr. Curt Rosenow of the New York Institute for Child Guidance to the meeting of the American Orthopsychiatric Association.

Dr. Rosenow has made an extensive statistical study of the children coming to child guidance clinics in Cleveland and Philadelphia, from which he draws the above fact. As far as second and third children of small families are concerned, the figures did not permit any very definite conclusions, said Dr. Rosenow.

Possibly the fact that the oldest child has arrived first at an age when mental and emotional problems might develop is a factor in the more frequent appearance of these children at the clinics. Certainly younger children are born into a situation typically different from the one into which the first born is introduced. This must be taken into consideration. However, nothing can be concluded on the basis of primogeniture alone, Dr. Rosenow declared.

Science News-Letter, March 2, 1929

Future Metal Supply Doubtful

Metallurgy

The world's metal supplies in the rocks of the earth are showing signs of failing and experts are worried over whether the most efficient applications of science and technology can keep pace with the demands of coming generations. This state of low supplies in the mineral cupboards of the future was revealed to the meeting of the American Institute of Mining and Metallurgical Engineers in New York, when D. F. Hewett, geologist of the U. S. Geological Survey, discussed the production of metals in Europe during the last 300 years.

The European trend toward cartels and understandings to control such metals as iron and steel, mercury, aluminum, zinc, lead and copper, has arisen from the unspoken realization that Europe's metal production has taken a downward tendency, Mr. Hewett said.

In America vast resources of iron, copper, lead, zinc, silver, and gold have been attacked so vigorously that many leading districts are approaching exhaustion, and metal production is being maintained by the application of new metallurgical processes to lower grade ores. American mining

operations are deepening shafts at a rate two to four times as fast as those of Europe, Mr. Hewett observed. Whereas mines in Europe range from 1200 to 1600 feet in depth, American mines are often in excess of 4000 feet.

If we are willing to pay the price in fuel, power, and labor, enough iron, manganese, aluminum, and gold can be produced, Mr. Hewett indicated, but mercury, lead and chromium are more localized and less likely to be produced in sufficient quantities for future generations even if the price is increased to stimulate the supply.

Science News-Letter, March 2, 1929

T. B. Takes Two Years

Medicine

Every white baby boy born in this country could expect to live to 57.3 years if tuberculosis were eradicated, and the country would be saved a loss of \$179,000,000. This sum is the annual monetary loss due to deaths from tuberculosis, estimated Harold D. Larsen of the University of Wisconsin.

The loss in life expectation is 1.93 years for every white male at birth.

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Human Eye More Acute Than Bee's—Continued

vented its use. With the aid of his colleague, he has overcome these difficulties by combining the caesium with magnesium. The magnesium binds the invisible caesium layer to the wall of the glass bulb, and also an electrical connection with it.

Its sensitivity is higher than that of other cells. Also, the color to which it is most sensitive comes very close to that to which the eye best responds. The eye is most sensitive to yellow light. So is pure caesium. The caesium-magnesium, as used in the new cell, responds best to bluish-green light, while the ordinary potassium cell responds best to deep blue. The use of such a cell as the new one in television would give an image with color values closely approaching those of the eye.

Wax Man With Metal Ears

A life-sized, man-shaped dummy, with a wax head and ears consisting of radio head receivers imbedded in the wax at the place of the eardrum, was the apparatus used by F. A. Firestone and D. L. Rich of the University of Michigan in recent experiments.

A loud speaker unit connected to a pipe was set flush with the roof of a building on which the experiments were made. The dummy was arranged so that it could be turned to any position or distance with respect to the sound, or any distance from it. Sound waves vibrating the diaphragms of the phones caused an electric current, which they measured. As a result, they announced, they found that the actual measurements were very close to others that had been calculated theoretically on the basis that the head is a rigid sphere in free space.

Stereoscopic Movies Possible

Stereoscopic motion pictures, that seem to possess depth from any position, and not requiring any special viewing apparatus between the subject and the screen, were described by Dr. Herbert E. Ives, of the Bell Telephone Laboratories. However, he emphasized that the apparatus for taking and projecting them is complicated and costly.

The method makes use of a principle for obtaining still stereoscopic pictures that he described before the

meeting of the Optical Society last year. The screen consists of translucent material. Just in front of it, and just behind it, are vertical gratings with wide opaque strips separated by much narrower transparent areas. A large number of motion-picture machines project onto the screen from a number of films that were made with a large number of cameras on all sides of the subject.

The result is that no matter where a person sits, so long as he is in front of the screen, he sees the picture in relief. Because of the gratings, one eye sees a picture made with one camera, and the other the next, made with another camera. This gives the stereoscopic effect, and as the observer moves from one side to the other he sees what appears to be a solid object.

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In a Blind Alley

Evolution

WILLIAM CROWDER, in a Naturalist at the Seashore (*Century*):

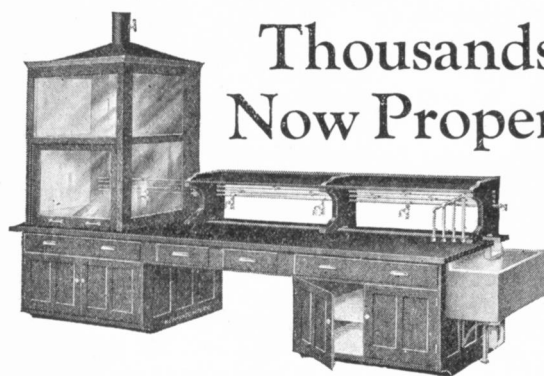
There is one group, or phylum, of marine animals, however, of which since the time of its most ancient day no record has been traced. It was ancestral to no land form, living or extinct. The echinoderms, to which our serpent-star belongs, have not now, and never have had, any relatives near or remote living away from the sea. In this isolation they are unique. Nature seems somehow long ago to have abandoned all effort to lift them to a higher plane; the modern representatives appear not to be greatly altered in form during these millions of years since their ancestors turned to stone.

That they have changed since those days is inevitable, but they have nowhere given rise to higher and more specialized forms, such as are to be found among the other groups. Their evolutionary progression has been slow; and if we cite the sea-cucumber as an example, which is wormlike in even more ways than its appearance would imply, this is one instance in which it seems there has taken place actual regression.

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Flashing lights, electrically operated, for lighthouses were first proposed in France, in 1882.

A professor of dentistry at the University of California is straightening the teeth of twelve monkeys.



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