PHYSICS

Three-inch Pieces of Light

A method of cutting off three-inch pieces from a beam of light, like a meat cutter slicing a bologna sausage, though the light moves at 186,000 miles a second, is described by Dr. Ernest O. Lawrence and Dr. J. W. Beams of Yale University.

Though light travels so fast that it can encircle the earth seven times in a second, the two physicists made use of a shutter that turned the light on and off with such rapidity that each "piece" of light was only about three inches in length. Each flash lasted a hundred billionth of a second.

The investigation was undertaken in an endeavor to measure the length of what are called "quanta" of light, for according to modern ideas, light is transmitted as separate pulses, each of which is called a quantum. Physicists have been uncertain as to how long these quanta are, but by some it was believed that they were as much as a yard in length.

These extremely short flashes of light were measured by a very delicate photoelectric cell, which gives off an electric current when illuminated, and they found that so long as the total amount of light reaching the cell was the same, the resulting current was not affected by the length of the individual flashes. One three inches long produced an effect as well as a piece of light many miles or more in length, and this shows, say the investigators, that the individual quanta are less than three inches in length.

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GENERAL SCIENCE

Schools Need Trade Journals

A plea that high school libraries allot a larger portion of their funds for scientific reading material to the purchase of trade journal subscriptions is made by Dr. Hanor A. Webb, professor of chemistry at the George Peabody College for Teachers. He believes that trade journals rather than books on applied science should form the bulk of such reading material, especially in schools where vocational guidance is practiced either formally or informally.

The trade journal, he believes, will provide more strictly current information, better descriptions and illustrations of present practices in the use of raw materials, modern equipment, and finally a more human aspect of industry.

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BIOLOGY

Microscopic Operations

Surgery under the microscope, performed on the minute bits of living tissue of which plants are set together, by means of needles so fine and delicate as to make hairs seem almost like crowbars by comparison, are performed by Prof. Geo. W. Scarth of McGill University, Montreal. Similar operations have been conducted on animal cells in the past. Work on plant cells is somewhat more difficult because of the tough outer coverings in which they are protected, but by pinning his specimens between two, or sometimes three points, Prof. Scarth has been able to manipulate structures within them that are almost invisibly small even under the microscope.

He states that the protoplasm, or fundamental living stuff, is not one substance but several. There is a basic matrix which does not move, and over and around this a layer of more fluid material that is constantly streaming as long as the cell remains alive. Similarly, the nucleus, the lump of special protoplasm that is the center of life in the cell, has a complex structure, for when he punctured its wall part of the contents came out like a fluid while a more solid residue was left behind.

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BIOLOGY—MATHEMATICS

Biology Needs Mathematics

Mathematics, the bugbear of many students, will be as important in biological research during the coming generation as it is now in the so-called "exact sciences" of chemistry and physics, and it will no longer be possible for the scientifically-inclined young man to flee from a study toward which he is disinclined into the biological field. Dr. Horatio B. Williams of Columbia University prophesies that a knowledge of higher mathematics will some day be required of advanced students in the sciences just as a reading knowledge of French and German now are.

However, Dr. Williams holds out some encouragement to the student who believes he has a "non-mathematical" mind. He doubts whether such a mind really exists. It is undoubtedly true, he states, that some students can master mathematics much more easily than others; but with patience and the guidance of the right kind of teachers even they can eventually conquer the subject.

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PSYCHOLOGY

Brain Hurt Changes Mind

The only known case in which the victim of a serious brain injury has happened to take a psychological test before and after the injury is described by Dr. Rose S. Hardwick, Boston psychologist. The chance happenings in this instance have given scientists an exact record showing the ways in which one individual's mentality was altered by injury to the brain.

The fourteen-year-old boy who was the victim of the accident had been tested psychologically because of difficulties at school. He was pronounced normal in intelligence, and after practical suggestions were given to him and to his parents, he showed marked improvement in school.

Four months later he was seriously injured by a truck. After the damage to the skull and the brain tissues had been repaired as far as possible, and the boy was released from the hospital he was again tested by Dr. Hardwick.

The tests showed that in general the boy has become somewhat slower mentally than before the accident. But where, prior to the accident, one of his mental difficulties had been his carelessness, he is now more accurate in his responses. This is not so true in his use of language, as he now has more trouble in expressing himself clearly and exactly, but where language is not involved, an improvement in accuracy in responding to instructions was evident.

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ANTHROPOLOGY

American Boys Taller

American boys are taller by at least two inches than the youngsters of the same age were when grandpa was a boy. How this change in American stature has been measured is described by Dr. Horace Gray of the Institute for Juvenile Research in Chicago.

Dr. Gray measured over 1,000 boys of American-born parents, between six and eighteen years, and compared their heights with those of boys measured 50 years ago by another scientist. The apparent increasing height of succeeding generations in this country is attributed by Dr. Gray chiefly to the increasing knowledge of health and control of disease. Infantile diseases, which so frequently damage growth, are more under control than in the past, and scientists are rapidly learning facts about the part that vitamins and sunlight play in growth.

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