

## NEW IDEAS OF LIGHT DECLARED IRRECONCILABLE WITH PAST

The new light on light gained by recent experiments is irreconcilable in many cases with the nineteenth century conceptions of the nature of radiation, Dr. Robert A. Millikan, director of the Norman Bridge Laboratory of Physics, Pasadena, revealed during the course of lectures at Cornell University.

"Very recently there has come into the possession of the race," said Dr. Millikan "knowledge of the relation between the frequency of ether waves and the energy of the electrons which emit or absorb these frequencies. This relation was not only undreamed of twenty years ago but it is completely irreconcilable with nineteenth century conceptions of the nature of radiation and the nature of the changes in the material bodies giving rise to ether waves."

The light that the human eye sees, the radio waves, the X-rays, the ultra-violet and infra-red rays are all ether waves that are radiated by electrons. And electrons are both matter and electricity and the stuff out of which the world is made.

Three Nobel prizes have been awarded, at least in part, for the development of this relation between the frequency of the ether waves and the energy of the electrons. The relation is expressed in the mathematical equation which states that half the mass multiplied by the square of the velocity, an expression that represents the energy of the electron, is equal to a constant of energy emission multiplied by the frequency of the radiating body minus the work necessary to get the electron out. This formula is the one for the first conception of which Einstein was given the Nobel prize in 1921; for the most important theoretical application of which Bohr was given the Nobel prize in 1922; and in part for the exact experimental proof of the validity of which the same prize for 1923 was awarded to Millikan.

Dr. Millikan in explaining this new conception stated that its correctness has been substantiated by very recent evidence furnished by experiments of Prof. A. H. Compton at Chicago, Profs. Bothe and Geiger at Berlin and E. C. Watson at Pasadena.

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## HOW ATOM SHUDDER CREATES LIGHT CALLED DEEPEST MYSTERY

One of the deepest of scientific mysteries today is the as yet completely unknown way in which the atom is able to transmute the energy of an atomic shudder into an ether or light wave of a single color. Dr. Robert A. Millikan, director of the Norman Bridge Laboratory of Physics, Pasadena, and Nobel prize winner, has declared in lectures recently before Cornell University that the way that the atom gives off light or other radiation does not consist, as nineteenth century physicists always assumed, in the vibration of particles synchronously with the frequency of the emitted ether wave.

The physicist is now perforce obliged to forego the attempt, at least at present, to find a mechanical picture of the act of radiation," Dr. Millikan explained, "an act which, however, ejects a ray from the atom which has a definitely measurable frequency and the frequency which is a definite measure of the energy lost by the

atom in the act of ejection. This energy appears at present to travel through space at least when the frequency is sufficiently high, as a vibratory dart of light."

Man is now able, thanks to science, to see the invisible, Dr. Millikan said. There has been a gradual extension in recent years of man's ability to receive and interpret ether waves which come to him outside the range in which he is endowed by nature with an organ, namely, the eye, capable of responding to ether waves at all.

"The range of frequencies to which the eye can respond is less than a single octave," he said, "and yet 100 years ago all that man had ever known of the outside world had been received through the aid of this little range of ether vibration. But beginning with the year 1881 and continuing up to within the last few months in which the higher frequency cosmic rays have been under quantity investigation, the range of man's perception has been extended, practically without breaks anywhere, through the ultra-red spectrum, the wireless wave spectrum, down to waves of infinite wave length and zero frequency, and on the other side up through the ultra violet spectrum through the X-ray spectrum, the gamma ray spectrum, and cosmic ray spectrum, up to frequencies ten million times higher than those of ordinary light. Most of our present knowledge of the sub-stomic world has come through the very recent increase in our ability to read the messages which come to us through these high frequencies."

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#### HEREDITY FACTOR IN PERNICIOUS ANEMIA

Though the causes of pernicious anemia are still unknown, clues have been found that throw considerable light on their nature.

In a talk before the American Medical Association recently, Dr. Lewellys F. Barker of Baltimore stated that evidence at present points to hereditary predisposition as one of the main factors in its occurrence. The presence in the digestive tract of poisons liberated by bacteria or minute animal parasites constitutes an external agent of accessory influence.

The causes of the disturbance of the equilibrium between blood-destruction and blood-regeneration in this disease are becoming much clearer, declared Dr. Barker. The condition of anemia, a lack of red corpuscles in the blood, is now recognized, he said, as only one part of a comprehensive disease-entity in which the digestive system, the nervous system, and the endocrine system are all involved. Investigators are endeavoring to establish the precise place in the malady as a whole that should be assigned to each of these factors.

Though as yet no actual cure for this disease has been achieved, a patient's conditions can be improved, according to Dr. Barker, and the progress of the malady held in check by various treatments with dilute hydrochloric acid, arsenic, blood injections and other measures. Early recognition of symptoms leading up to such a condition followed up with prompt treatment will tend to keep pernicious anemia latent. Dr. Barker strongly recommended that intermarriage of members of families in which it is known that the disease occurs should be discouraged.

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