

ASTRONOMY-PHYSICS

Eddington Explains Link Joining Atoms and Nebulae

“Most Elusive Constant of Nature” is Key
To Understanding in This Wedding of Great and Small

SHADE of Sherlock Holmes! How simple his deductions seem, my dear Dr. Watson, compared with the excursions that Sir Arthur Eddington makes to the heart of the electron (if the mathematical equation sort of creature the electron turned out to be can be said to have a heart) and to the depths of the expanding universe.

Sir Arthur, one of the most audacious and fruitful of the universe makers of today, has polished off in expanded form the public lecture that he delivered at the International Astronomical Union at Cambridge, Mass., last fall. It appears in four readable chapters (if you hopscotch a bit when formulae trouble you) as “The Expanding Universe” (Macmillan).

The “hidden hand” in the drama of the universe is the cosmical constant, usually known by the small Greek letter lambda. Sir Arthur admits that his exposé of the expanding universe, his explanation of how the whole material universe of stars and galaxies of stars is dispersing, is more or less of an excuse in his trapping of the cosmical constant. Lambda is, Sir Arthur says, the “most elusive constant of nature.”

Just how important the cosmical constant seems to be in the new frontiers of astronomy and physics is indicated by Sir Arthur. The galaxies, those great aggregations of stars seen as nebulae through telescopes, are phenomena on the grandest scale yet imagined. At the other end of the scale is the interior of the atom.

Ubiquitous Lambda

The connecting link is the cosmical constant. Ubiquitous lambda is the source of the scattering force, swelling the universe and driving the nebulae far and wide. In the atom, Sir Arthur finds, it has a different capacity, regulating the scale of construction of the system of satellite electrons. Sir Arthur believes that this wedding of great and small is the key to the understanding of the behavior of electrons and protons.

The cosmic constant is tied into the post-Einstein idea of the universe so tightly that Sir Arthur considers it based on a fundamental necessity of physical space, appearing in the law of gravitation that arises out of the admission that there is a radius of curvature of the universe that can be used as a comparison standard.

Impregnable

“The position of the cosmical constant seems to me impregnable,” Eddington writes. “If ever the theory of relativity falls into disrepute the cosmical constant will be the last stronghold to collapse. To drop the cosmical constant would knock the bottom out of space.”

The Bertillon measurements of lambda, the hidden hand? Its quantitative value expressed in fractions of centimeters to the minus second power is not very illuminating. Sir Arthur uses a whole book to explain how the cosmical detective story is being written.

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ENTOMOLOGY

Beetles Live Under Water Months Without Breathing

BEETLES with their anatomy all organized for breathing air, yet which live under water and get air to breathe only once in their lives, have been found in the cold, swift brooklets in the Great Smoky Mountains, between Tennessee and North Carolina. They belong to a rare and very little known group of insects, of which sixty species have been discovered so far in North America, report entomologists of the Smithsonian Institution, who have identified the latest captures.

The beetles hatch under water and live their larval lives submerged. After they pass through the pupal stage they come out for a little flight into the upper air, which insures their distribution. Then they get under water again and

never come to the surface any more.

In spite of their almost totally submerged lives, these beetles are not organized, as some insects are, for water breathing. They have no gills or similar apparatus, and although there is a small reservoir of air under their wing-cases, it appears doubtful whether this pocketful would suffice for normal breathing requirements for their months of life. The only suggestion that has been made is that they are naturally so inactive that their oxygen requirement is very low.

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PSYCHOLOGY

Child Invents Tools Like Those of Stone Age

EVEN IN this day of machine-made toys, children contrive tools and playthings strikingly like those made by primitive man in the Stone Age, Dr. Rosa Katz, of the psychological laboratory of the University of Rostock, Germany, found in a study of inventive genius as it appeared in her son Julius. She has reported her study to the *Journal of Genetic Psychology*.

Julius had read Robinson Crusoe, and probably got from that book the inspiration to be primitive (*Turn page*)



STONE AGE TOOLS

—find their counterparts in these playthings devised by Julius, the ingenious son of a German psychologist. To make his axe, he split the end of a stick previously made free from bark. He clamped a stone in the cleft and wound the shaft with a cord. “There is no doubt that this was the essential appearance of the first axe swung by the human hand.”