ASTROPHYSICS

Millikan Offers New Data on Cosmic Rays

IN THE DEPTHS of space, where atoms are sparse, a cluster of four hydrogen atoms, free from collisions for a long time, will jump over their potential wall and form a nucleus emitting a cosmic ray, Prof. Robert Andrews Millikan, of the California Institute of Technology, declares. Dr. Millikan's theory is based on the demonstration that atomic changes not found on the earth occur in the nebulae, where atomic collisions are infrequent. Dr. Millikan's new researches during the past summer support the view that cosmic radiation consists of the wirelessed birth-cries of helium, oxygen, silicon and iron, synthesized from hydrogen in interstellar space. His report was presented at the recent meeting of the British Association for the Advancement of Science.

Both Dr. Millikan and Sir Oliver Lodge attacked the second law of thermodynamics. "It is merely a generalization based on observation on earth, that all energy tends to be converted into heat and radiated away, hence lost," said Dr. Millikan. "A final inevitable increase of entropy to a maximum is a bugbear idol to which philosophers need not bow the knee," said Sir Oliver.

He also contended that the application of the unvivified laws of physics to the universe assumes there is nothing or no one to wind it up or guide it to some nobler end.

Referring to the new quantum theory, he said: "Guiding waves determine the path of a particle of matter. Whether there is any connection of life and mind is still an unanswered question."

Science News Letter, October 10, 1931

PSYCHOLOGY

Degrees of Badness in Bad Boys are Determined

HOW BAD is a bad boy? This question, which has been worrying parents for years, had become an even greater problem for the social or child clinic worker who must deal in an impartial manner with the misbehavior of great numbers of boys and girls. Dr. Luton Ackerson of the Institute for Juvenile Research in Chicago has determined statistically the degree of badness of various types of bad behavior as judged by three different standards.

One of these standards is the relation of the particular trait to an otherwise unhealthy personality. From this point of view the most serious traits are a definite diagnosis of mental disease, "queerness," depression, talking to self; one of the least serious is disobedience.

From the point of view of association with a large total of bad conduct, the worst offenses include swearing and bad language, making trouble in the home, destructiveness, "annoying" girls, running away, disobedience, stealing and fighting.

The third way of judging was according to the chances of arrest. Here running away, stealing, bad companions, truancy, staying out late at night and loitering lead the list, and fighting, swearing, fire-setting, and sex delinquency come at the end.

Science News Letter, October 10, 1931

ARCHAEOLOGY

Philistine Stronghold Among Oldest Settlements

GAZA, the Philistine stronghold whose gates Samson carried away and where he later brought death to his enemies and himself alike beneath the ruins of their temple, is apparently one of the oldest of human settlements. This was disclosed when a report of excavations by Sir W. M. Flinders Petrie, noted British archaeologist, showed a history of human occupation on the site of the old city running back to New Stone Age times.

There were two sites of Gaza. The "New Town," dating back beyond Samson, is still there. The "Old Town," whose ruins Flinders Petrie has just been exploring, is about five miles away. It had grown old and was abandoned by its inhabitants about 2000 B. C.—a thousand years before the siege of Troy.

The latest period of occupation of the old city was that of the Hyksos, the wild horsemen from the north, who also conquered Egypt. Burials of their warriors usually have horse skeletons and trappings along with the human remains. The steed went with his master into the next world.

Beneath the Hyksos stratum the explorers found evidences of the older Canaanite culture, a higher civilization than that of the invaders who overran it. These Canaanites had city planning, public baths, and well-built religious shrines. They had skillfully made gold jewelry, and their weights indicate trade with Egypt, North Syria and Babylonia.

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IN SCIENC

BOTANY

X-Rays Find New Beauties For Students of Flowers

See Front Cover

SEARCHING the secrets of a flower's heart acquires new esthetic significance at least, and may become of importance in plant physiology and anatomy, too, through an X-ray technique developed by Mrs. Hazel Engelbrecht, of Des Moines. It is not the first time that X-rays have been used on flowers; but Mrs. Engelbrecht has brought to bear a rare combination of most sensitive control of her unusual medium and an appreciation of pictorial composition that makes the result, though novel, art in its truest sense.

Science News Letter, October 10, 1931

PHYSICS

Rejuvenation of Glass Accomplished by Heat

REJUVENATION of tired glass has been accomplished in experiments by A. Q. Tool and R. Stair of the U. S. Bureau of Standards.

Special glass used to pass ultraviolet light and permit the sun to give its full share of health rays to man, may get tired and refuse, as ordinary glass does, to let the health rays through. But the experimenters found that by heating this glass at about 500 degrees Centigrade for a few hours, it may be brought back to ultraviolet transparency.

Chemical changes involving oxidation of the iron content of the glass are usually held responsible for its gradually becoming opaque to ultraviolet light. Mr. Tool and Mr. Stair considered the phenomenon called "thermoluminescence." It seemed as though the glass absorbed light when in use, becoming discolored and tired. Then during the heat treatment it gave off its pent-up light in a glow which lasted until its discoloration had disappeared and it was ready to serve again.

The temperature treatment if too low will not completely restore tired glass to its former transparency to the ultraviolet light, the experimenters explained.

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E FIELDS

ARCHAEOLOGY

Ancient Counterpart Of Church Discovered

TWO MILLENIA before the earliest known church, there existed in Crete a place of worship surprisingly like a modern chapel, Sir Arthur Evans, British archaeologist, says in reporting the discovery of a temple-tomb of a house of Minos south of Knossos. This ancient counterpart of a church was the residence of the priestly warden of a Minoan Holy Sepulchre. The private chapel had choir stalls and chancel screens, and in its inner sanctum an altar and sacred cult-symbols. One funeral vault temple unearthed nearby contained miniature jugs indicating that snake worship was part of the rites.

Sir Arthur unearthed a sepulchral monument beneath a limestone bluff south of Knossos, following a clue given by discovery of a massive gold signet ring which grave robbers had dropped nearby during their plundering, after the temple had been partially ruined by an earthquake in 1520 B. C. A mortuary chamber excavated in the rock was combined with the sanctuary building; it was surmounted by a columnar shrine above ground. The discovery confirms a very ancient Cretan tradition, preserved by Diodorus, that after the treacherous death of the last king, named Minos, a magnificent dual monument tomb was built for him under the earth, with a temple above it dedicated to a goddess. The temple-tomb has a pavilion for funeral feasts and a paved court for funeral sports.

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ARCHAEOLOGY

American Museums May Profit by New Greek Law

MUSEUMS and art galleries in this country may yet be enriched by real Greek sculptures and vases to replace many plaster casts of such things that they now display. A new Greek law makes this possible—if the law can be carried out.

Difficulties involved in putting the new law into effect are explained by Arthur S. Riggs, editor of *Art and Archaeology*, who has just returned from Athens. The new law, passed by the Greek Government, permits the National Museum of Archaeology to sell duplicates of antiquities, Mr. Riggs said. Tons of such material are stored in the basement of the museum. Vases, figurines, some metal work and many beautiful fragments unearthed in excavations are lying there, and much of the material duplicates objects on exhibit.

Institutions in America and other countries have always been eager to obtain just such objects as these.

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PUBLIC HEALTH

Foreign Experts Studying U. S. Ship Fumigation

LATEST methods of fumigating loaded ships, as used at the New York quarantine station of the U. S. Public Health Service, have just been observed by a group of experts appointed by a special commission of the Health Section of the League of Nations.

These experts reported they were highly pleased with the methods, which were demonstrated by Surgeon Charles L. Williams, U. S. Public Health Service. They will present a report of their investigations to the League of Nations next month.

Surgeon-General Hugh S. Cumming, U. S. Public Health Service, is chairman of the committee of experts. Other members are: Dr. R. C. Stock and Dr. C. W. Monier-Williams of the British Ministry of Health, London; Dr. Adolfo Vila of Cadiz, Spain; Dr. M. F. DeBruyne of Rotterdam, Holland; Dr. Charles Vigne of Havre, France; Dr. William Dryer of Bremerhaven, Germany; and Dr. Charles L. Williams, U. S. Public Health Service.

Fumigation of ships is carried on to destroy rats and vermin that might carry disease, and thus to protect seaports and nations generally from importation of disease. The U. S. Public Health Service seems to have met satisfactorily the difficult problem of fumigating loaded ships.

The method, as described by Dr. Williams, consists in spraying liquid hydrocyanic acid under a pressure of 75 to 100 pounds.

Other methods of fumigation will still be satisfactory on the ordinary ship which does not present special problems.

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ENGINEERING

California Building Heated by Refrigeration

REFRIGERATION in sunny California now provides for winter heat. The same system that cools air in summer has been made to warm things up when the snow starts thickening on the mountain peaks.

In a new office building, erected for an electrical company in Los Angeles, suitable apparatus has been installed. As in an ordinary refrigeration system, the refrigerant is vaporized by absorbing heat from a container of water, which it cools. When it condenses it heats up the water of a second container.

Air is passed over the cooled water to make the building comfortable in summer. During the winter months, the water from the condenser is circulated through a tubular device which raises the building's air supply to a temperature of 80 degrees Fahrenheit. To provide for an outside source of energy, necessary in the operation of the system, the atmosphere is used. Towers on the roof of the building force an air draft which gives the water in the two containers temperatures from which the refrigeration system can operate.

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PSYCHOLOGY

Forgetting Believed Not Primarily Due to Disuse

WHEN THE stenographer blames lack of dictation for her loss of memory of shortland, she is laying the trouble to only a minor factor in her forgetting, is the assumption that can be drawn from a recent psychological study of this failing. Forgetting is not primarily due to disuse, but to the experiences that occur during the period of disuse, Dr. John A. McGeoch, of the University of Missouri, stated.

"Disuse is significant only in that it gives other factors a chance to operate," Dr. McGeoch said. The experiences which follow the learning may have a backward-acting effect in inhibiting memory.

"Other factors, such as the method of learning, the age of the subject, the character of the material, and disuse itself, may set limits to the operation of the primary factors, but are themselves secondary in importance."

Forgetting is not just the opposite of remembering, Dr. McGeoch believes.

Science News Letter, October 10, 1931