making predictions concerning a system on the basis of measurements made on another system that had previously interacted with it leads to the result that if (1) is false then (2) is also false. One is thus led to conclude that the description of reality as given by a wave function is not complete.

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Among the curious accidents that happen are a number of instances of small live fishes becoming impacted in throats of men.

"The buffalo was the great forerunner of the automobile; he made the best pioneer roads and the widest," says a writer in *Outdoor Indiana.*

PHYSICS

Earth's Lop-Sided Magnetism Provides Check of Cosmic Rays

THE lop-sided magnetism of the earth is now being used to study the nature of cosmic radiation, it was indicated in the address of the world-famous Belgian scientist Abbé Lemaître before the meeting of the American Physical Society.

Father Lemaître read the paper of Prof. M. S. Vallarta of Massachusetts Institute of Technology on the "Longitude Effect of Cosmic Radiation." Prof. Vallarta with Father Lemaître developed the theory of cosmic rays so well supported by scientific evidence which assumes that all the incoming rays are of a particle nature and are charged with electricity.

The earth's magnetic field, Father Lemaître explained, is not perfectly symmetrical, but acts as if its center were about 186 miles from the ideal center of the earth. The resultant field on the outside, therefore, is a bit off-center too.

Calculations on what the magnetic lop-sided effect should be on cosmic ray intensity at widely separated points about the earth gives almost perfect agreement with experimental measurements, Father Lemaître said. Data taken in places all around the world from zero longitude at Greenwich, England, to the Antipodes on the opposite side of the earth all fall on the new calculated curves.

There is but one set of observational data which does not fit the new theoretical curves. These data were obtained by Prof. Robert A. Millikan and Dr. Victor Neher on an automatic instrument placed aboard a ship enroute from Honolulu to Sydney-Melbourne. Other data by these scientists fit perfectly well, Abbé Lemaître explained. The new report lends additional support to the idea that cosmic rays are particles.

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$$
\begin{aligned}
1 \quad & \Psi' = A\Psi = a\Psi \\
2 \quad & \Psi = e^{\frac{2\pi i}{h} p_0 x} \\
3 \quad & P = \frac{h}{2\pi i}\frac{\partial}{\partial x} \\
4 \quad & \Psi' = P\Psi = \left(\frac{h}{2\pi i}\right)\frac{\partial \Psi}{\partial x} = p_0\Psi \\
5 \quad & q\Psi = x\Psi = a\Psi \\
6 \quad & P(a,b) = \int_a^b \bar{\Psi}\Psi\, dx = \int_a^b dx = b-a \\
7 \quad & \Psi(x_1, x_2) = \sum_{n=1}^{\infty} \Psi_n(x_2)\, u_n(x_1) \\
8 \quad & \Psi(x_1, x_2) = \sum_{s=1}^{\infty} \phi_s(x_2)\, v_s(x_1) \\
9 \quad & \Psi(x_1, x_2) = \int_{-\infty}^{\infty} e^{\frac{2\pi i}{h}(x_1 - x_2 + x_0)p} dp, \\
10 \quad & u_p(x_1) = e^{\frac{2\pi i}{h} p x_1} \\
11 \quad & \Psi(x_1, x_2) = \int_{-\infty}^{\infty} \Psi_p(x_2)\, u_p(x_1)\, dp \\
12 \quad & \Psi_p(x_2) = e^{\frac{-2\pi i}{h}(x_2 - x_0)p} \\
13 \quad & P = \frac{h}{2\pi i}\frac{\partial}{\partial x_2} \\
14 \quad & v_x(x_1) = \delta(x_1 - x) \\
15 \quad & \Psi(x_1, x_2) = \int_{-\infty}^{\infty} \phi_x(x_2)\, v_x(x_1)\, dx \\
16 \quad & \phi_x(x_2) = \int_{-\infty}^{\infty} e^{\frac{2\pi i}{h}(x - x_2 + x_0)p} dp = h\delta(x - x_2 + x_0) \\
17 \quad & Q = x_2 \\
18 \quad & PQ - QP = \frac{h}{2\pi i}
\end{aligned}
$$

EINSTEIN USES THESE COMPLEX EQUATIONS

PHYSICS

Create Forces Equal to 1,200,000 Times Gravity

SPINNING a duralumin rotor in a vacuum, science can create forces equal to 1,200,000 times that produced by the gravitational pull of the earth, it was reported to the American Society by Dr. E. G. Pickels, of the University of Virginia.

Such an enormous force offers the possibility of being able to pull molecules apart. Centrifugal force 1,200,000 times as great as the force of gravity may be explained by saying that gravity makes an object dropped from a high building fall 16 feet in the first second. If the force of gravity were as large as the force in Dr. Pickels' ultracentrifuge, a dropped

object would fall 19,200,000 feet in the first second, or more than 3,600 miles.

Using air pressure of 50 pounds to the square inch to drive the rotor, top speeds of 156,000 revolutions each minute were obtained. At this point the rotor flew apart and the calculated centrifugal force was 1,200,000 times the force of gravity.

"Photographs of molecular sedimentation in an observational centrifuge," Dr. Pickels said, "demonstrate the possibilities of the apparatus in molecular weight determinations."

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PHYSIOLOGY

Tree-Climbing Children Now Approved by the Physician

Exercises That Stretch the Chest Muscles Help To Flatten the Chest and Avoid Tuberculosis

LITTLE Johnnie's tree-climbing tendency received the stamp of medical approval at the meeting of the American College of Physicians. The OK was granted subject to the reservation that Johnnie does not receive injury to life or limb.

As the family offspring flits from bough to bough in emulation of Tarzan, his mother can take heart in knowledge that his chest is changing from its babyish barrel shape to the normal flat chest of maturity.

The normal chest, Dr. S. A. Weisman of the University of Minnesota told his medical colleagues, is of the flat type, despite popular opinion to the contrary. And just to console further the frantic mother of a tree-climbing son, Dr. Weisman said that flat-chested persons are less liable to develop tuberculosis. And they are, on the average, taller, heavier and have better mental ability as shown in their scholastic records.

The healthy flat-chest, as described by Dr. Weisman, is narrow from front to back and wide from side to side. The deep chest of tuberculous patients is thick from front to back and narrow from side to side. Not all deep-chested persons will necessarily have tuberculosis, but they have a greater predisposition to it than the flat-chested persons. In normal adult persons the depth of the chest is 67 per cent. of the width. In tuberculous persons the depth is 77 per cent. of the width.

The tuberculous deep chest is like that of an infant, Dr. Weisman said. The new born baby's chest is nearly round, as deep as it is wide, but by the age of five it should normally have flattened out into adult proportions.

Exercises that stretch the chest muscles will help to flatten the chest. Tree-climbing and ladder-climbing are good exercises for this, he said. Dr. Weisman thinks all children entering school should have their chest measurements taken, and if they show the deep-narrow type the children should be given proper exercises to correct the condition. Poor posture, such as drooping or round shoulders, and protruding shoulder blades are the result, not the cause of the deep-narrow chests. Flat-chested persons may stand with shoulders dropped forward, but they are not likely to.

Women have naturally deeper chests than men, but Dr. Weisman thinks women of the future, as a result of the more active, athletic lives they now lead, will tend to have chests as flat and wide as men normally have now.

The flat chest has a greater vital capacity, that, is it can suck in more air, and consequently more oxygen is supplied to the brain and other tissues of the body. This Dr. Weisman believes, may account for the better scholastic standing and greater mental ability he found in the average flat-chested individual when compared with the average deep-chested person.

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ANTHROPOLOGY

Human Race May Lose Half Of Upper Front Teeth

WE MAY be on the way to losing half our upper front teeth.

This is indicated by studies by Prof. M. F. Ashley-Montagu, of New York University, reported to the meeting of the American Association of Physical Anthropologists. He finds that along with the tendency of the human face to become narrower goes a decrease in size of the two outer incisors, or "cutting teeth," in the upper jaw. In many cases they disappear altogether. This tendency, however, is not found in apes and monkeys.

Also discussing teeth, Dr. Milo Hellman, Columbia University, told his colleagues that wisdom teeth reach full development in people who are tallest and heaviest.

And, he added, while women mature more rapidly than men in almost every other respect, the males win in the race of wisdom teeth. Men have much less "trouble with their wisdom teeth" than women. The reason appears to be that the male jaw goes on growing after that of women contemporaries stops.

Another speaker, Dr. Adolph H. Schultz, of the Johns Hopkins University, reported that apes are like men in having one arm and one leg longer than the other. The difference between right and left legs is about the same in the two groups, but in man the longer arm (usually the right) exceeds the shorter by a larger length percentage than is the case of his lower evolutionary relatives.

Dr. Schultz made his findings as the result of detailed measurements on arm and leg bones of twelve hundred human and ape skeletons in the collections of the U. S. National Museum and Western Reserve University, Cleveland. This is the largest series of measurements ever made on physical asymmetry, or "lopsidedness."

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MEDICINE

Many "Problem" Children Now Treated Successfully

MAKING "bad" boys and girls over into acceptable members of society was described by Drs. Earl D. Bond and Lauren H. Smith before the American College of Physicians in Philadelphia. The boys and girls in this group had become behavior problems as a result of head injuries or rather mild inflammations of the brain. The children were so bad that they had become a menace to the community. A busy life in a special institution, interviews in the playroom with the psychiatrist, and a chance to try themselves out as members of a small, selected community, enabled one-third of the children to attain satisfactory behavior and mode of conduct.

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