

PSYCHIATRY

Monkeys Can Be Affected By Subliminal Perception

► EVEN A MONKEY may be affected by being shown a symbol of which he is not aware.

The technique known to scientists as subliminal perception, and to advertisers as the "secret sell," apparently is effective with monkeys. However, the outward behavior of the monkey is not changed at all, Drs. I. Arthur Mirsky and Robert E. Miller of the University of Pittsburgh School of Medicine reported to the American Psychiatric Association meeting in Philadelphia.

The animal was first conditioned by showing him the symbol at the same time that he received a painful electric shock. The animal learned to avoid the electric shock by pressing a bar lever as soon as he saw the symbol. The monkey's heart, which beat faster when the shock was applied, soon would speed up also when only the symbol was presented.

Then the experimenters shortened the exposure time of the symbol until it was flashed before the animal for only thousandths of a second.

The animal's heart beat faster when the symbol was shown so briefly that he failed to press the lever—apparently was not aware of the symbol. Although the monkey was inwardly affected by the "invisible" symbol, his outward behavior was not changed.

The monkey is able to read the expression of other monkeys, these experiments showed. If one animal is frightened, he can communicate the fear to another monkey. Even color photographs of a fearful monkey can cause fear in the monkey that looks at them.

Science News Letter, May 9, 1959

TECHNOLOGY

Process Converts Textiles Directly to Pure Graphite

► GRAPHITE CAN now be produced in flexible fibers and woven fabrics. A new process has been developed that converts organic yarns, braids and felts directly to graphite with a 99% purity.

Experimental quantities of graphite cloth are being evaluated as reinforcing agents for various plastics and refractory materials used at high temperatures, such as in nose cones of space missiles.

Graphite fibers may also be used to impart electrical and heat conductivity to non-conducting materials such as plastics, ceramics and glass cloth.

The complex process, developed by National Carbon Company, division of Union Carbide Corporation, is a thermo-chemical conversion in which a fiber or fabric, such as rayon, is graphitized by electrically heating it to a temperature near 5,400 degrees Fahrenheit.

In this way the crystalline structure of the material is made to resemble conventional graphite used in electric furnace electrodes, nuclear reactor structures, and other industrial jobs.

The combination of properties and available forms makes chemical, electrical and mechanical applications of graphite textile forms virtually limitless.

At ordinary pressures, graphite has no melting point and sublimates (goes directly from the solid to the vapor state) only at extremely high temperatures. Furthermore, graphite gets stronger at higher temperatures. Its tensile strength at 4,500 degrees Fahrenheit is about twice that at room temperature.

Graphite textiles are resistant to attack by acids, alkalis, and organic compounds, except for those of a highly oxidizing nature, and are unreactive with many molten metals.

They have excellent electric and heat-carrying properties and are immune to thermal shock. Graphite also has useful lubricating qualities.

Science News Letter, May 9, 1959

PHYSICS

More A-Bomb Explosions High in Air Suggested

► THE UNITED STATES will explode more atomic bombs high in the atmosphere to create artificial auroras, to gather information on the earth's magnetic field and other geophysical effects, if the hopes of the father of Project Argus are realized.

Nicholas C. Christofilos of the University of California, Livermore, Calif., told the National Academy of Sciences meeting in Washington, D. C., that more experiments of the Project Argus type would be of importance in studying the behavior of the earth's outer atmosphere. (See SNL, March 28, p. 195.)

The suggested experiments would be a follow-up to Project Argus, in which three small atomic bombs were exploded at a height of 300 miles over the South Atlantic late last summer.

Project Argus yielded much valuable information about how electrons, negatively charged particles, behave in the earth's magnetic field. Electrons released by the A-bomb tests formed a shell around the earth that remained for several days in a relatively fixed position in space.

Mr. Christofilos considers high altitude atomic tests an important tool for probing the earth's magnetic and electric fields, and the structure of the very rarefied atmosphere hundreds of miles in space. Information gathered by Project Argus has proved very useful in studying and interpreting the natural radiation belts discovered by Dr. James A. Van Allen and his co-workers at the State University of Iowa from flights of Explorer satellites through the concentrated radiation regions.

The explosion of small bombs in outer space is completely harmless as far as creating a radiation hazard is concerned, Mr. Christofilos said. However, he warned, explosions of megaton bombs can create radiation hazards. Even a one megaton bomb exploded in the proper location in outer space would deliver to a man in a satellite a deadly dose, some 400 roentgens, in less than three hours.

Science News Letter, May 9, 1959

IN SCIENCE

PUBLIC HEALTH

Forecast 25% Increase In Air's Carbon Dioxide

► A 25% INCREASE in the amount of carbon dioxide in the earth's atmosphere during the 150-year period ending in 2000 A.D. has been forecast.

Dr. Bert Bolin of the University of Stockholm in Sweden told the National Academy of Sciences meeting in Washington that the burning of coal, oil and gas was adding carbon dioxide to the air at about one-half a percent each year. This is such a rapid rate the increase will be easily detected within a few years.

The increase in carbon dioxide in the atmosphere during the last 100 years, he said, is much more likely to be about eight percent than the usually quoted two percent. Carbon dioxide is believed the cause for earth's suspected warming trend of two to three degrees Fahrenheit in the last 50 years. It acts like the glass in a greenhouse to keep heat from escaping into space but allowing the sun's rays to pass.

Dr. Bolin said the application of his new figure to future climate changes is not well understood and called for further studies of the effects of carbon dioxide in the atmosphere.

Dr. Bolin's new rate for carbon dioxide addition is based on an examination of how this chemical affects the ability of ocean water to absorb it after a certain amount has been added. By doing this, Dr. Bolin said he had reconciled the two different values quoted for the increase in atmospheric carbon dioxide during the last 100 years.

The two percent value is based on comparisons of the radioactive carbon-14 compared to the usual form, carbon-12. The less reliable direct measurements give ten percent.

Science News Letter, May 9, 1959

ASTRONOMY

New Group Appointed To Study Moon's Surface

► LONG-RANGE scientific explorations of the moon's surface and environment will be conducted by a new group appointed by the National Aeronautics and Space Administration.

The group, which will be headed by Dr. Robert Jastrow of NASA, will correlate experiments in the general areas of probes and orbiters, advanced orbiters, hard landings, and soft landings. Other such working groups on satellite beacons and orbiting astronomical observatories have previously been announced by NASA.

Science News Letter, May 9, 1959

E FIELDS

AGRICULTURE

Gibberellic Acid Increases Uplands Pasture Grass

➤ GIBBERELIC acid, the plant growth promoting substance, may be a boon to the livestock owner.

Research reported by two Australian scientists indicates that gibberellic acid can increase winter growth of pasture grass and clover significantly. Also, they report, there appears to have been no harmful effect on the health or live weight of sheep fed the treated grass.

"The problem of restricted winter growth of pastures is of agronomic importance in countries in high latitudes and in the uplands of certain others," the scientists point out. Gibberellic acid may become an important factor in increasing pasturage. They found that treated plots gave a higher yield of both clover and grass after the first two monthly harvests.

After the third harvest, grass yield was as high as in untreated plots, but the clover yield was down. Both clover and grass yields were lower than the control plots after the fourth harvest.

Details of the study, carried out by G. Scurfield and E. F. Biddiscombe of the division of plant industry, Commonwealth Scientific and Industrial Research Organization, Canberra, appear in *Nature* (April 25).

Science News Letter, May 9, 1959

ENDOCRINOLOGY

Enzymes Key To Human Diseases

➤ CHANGES in the large molecules in the human body, nucleic acids, sugars and proteins or enzymes, are suspected as the root of inherited diseases.

Sensitivity to primaquine, an antimalarial drug, is one gene-determined defect that is receiving intensive study, Dr. H. N. Kirkman told a symposium. Persons with primaquine sensitivity develop hemolytic anemia after eating fava beans.

Some diseases are characterized by the inactivity of a certain enzyme necessary for specific chemical steps to take place in the body, the National Institutes of Health researcher said. However, it is necessary to determine whether the enzyme is actually absent or is too defective to function.

Previous investigators have found that the red blood cells of affected persons have only five percent to 20% the activity of the enzyme glucose-6-phosphate dehydrogenase. Dr. Kirkman reported that he has been able to extract the enzyme in a partially purified form from human red blood cells.

Comparison of the catalytic activity of the enzyme in normal and in primaquine-sensitive persons' blood revealed no qualitative difference between the two enzymes. Apparently the enzyme inactivity in disease-

susceptible persons is due neither to molecular "warping" of the enzyme nor to a removable inhibitor, Dr. Kirkman said.

Further purification and studies of the enzyme are in progress, he told a symposium on molecular genetics and human disease meeting in Syracuse, N. Y.

Another study of the role of glucose-6-phosphatase has contributed a further link in the chain of events that connects the altered blood glucose of the diabetic with this enzyme's activity.

It had already been known that diabetic rats' liver cells contained about twice as much of this enzyme as normal rats' liver cells. The mechanism of this over-activity was unknown, however. Now research by Dr. H. L. Segal of the department of biochemistry at the University of Pittsburgh indicates that a change takes place in the microsome, not in the enzyme itself.

Exactly what change takes place in the diabetics' microsomes—the so-called "protein factories" found in all living cells—is still unknown. However, by removing the glucose-6-phosphatase from the microsomes and finding that differences persisted between diabetic and normal animals, Dr. Segal and his associates have pinpointed the trouble spot.

Details of the techniques used in the studies of rat liver glucose-6-phosphatase were reported at the recent annual meeting of the Federation of American Societies for Experimental Biology.

Science News Letter, May 9, 1959

PHYSICS

Newsletter Will Publish Nuclear Physics Data

➤ A NEWSLETTER that will quickly spread among scientists the latest information from studies in high energy nuclear physics is being supported by the National Science Foundation.

The Foundation has granted \$7,000, matching an equal contribution from Soviet Russia, to establish this needed new publication. The grant is part of a program to further international scientific cooperation.

High energy physics studies concern the frontier of atomic probings, the structure and particles making up the nucleus. Such nuclear information is garnered both from tracks left in photographic emulsions by the powerful cosmic rays continuously bombarding the earth from space and from atom smashers, the giant machines that accelerate elementary particles to energies near the speed of light.

The newsletter is expected to begin publication shortly in Geneva, Switzerland, with the assistance also of the International Union of Pure and Applied Physics and the European Organization for Nuclear Research (CERN).

It will provide a rapid and economical means for exchange of information between scientists of all nations, helping to prevent expensive duplication of effort and facilities in instrumentation and in accelerator development. The Foundation's grant was made through the National Academy of Sciences-National Research Council.

Science News Letter, May 9, 1959

MEDICINE

Doctors Now Wear TV Camera to Teach

➤ NOW THERE is a special television camera for doctors—they wear it on their heads.

A small camera has been devised to solve the difficult medical problem of showing students critical areas within the ears, nose, throat and other body cavities.

A pilot model of the camera has already been used in ear, nose and throat teaching, Drs. Paul Moore and Hans von Leden of Northwestern University Medical School report in the *Journal of the American Medical Association* (April 25).

Normally, only one person can look into a body cavity at one time. The problem in the past has been solved through the use of mirrors, which allows one other person to see. Ordinary photography prevents the students from seeing the area at the time the examination is done.

This TV camera allows the examiner to see the field clearly, allows a normal range of motion for the examiner, and permits others to see on a television screen the very same area the examiner sees, the doctors said.

The camera itself is mounted on a helmet made of fibrous glass. A periscope is attached to the camera. The mirror and lens system of the periscope is so constructed that the image is reflected upward to the camera lens while allowing the same image to pass through to the eye of the examiner.

Mirrors or a small lamp attached to the periscope provide a source of light. The pilot model still needs some modification, the inventors said. They hope eventually to provide colored pictures that would help show the natural features of the areas being examined.

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BIOCHEMISTRY

Cod-Liver Oil Is Potent Cholesterol Lowerer

➤ IN CONTRAST to animal fats which increase the serum cholesterol level in the body, oil from marine animals—seals, sardines, whales—seems to lower the level.

Since cholesterol is believed to be associated with atherosclerosis, research reported on the potent cholesterol level reducing activity of cod-liver oil may be important in human medicine. It is more potent than some vegetable fats tested.

Rats fed a diet of starch to which cholesterol and coconut oil were added received both corn oil and cod-liver oil as dietary fats. The fish oil, report A. P. de Groot of the Central Institute for Nutrition and Food Research, Utrecht, and S. A. Reed of the Marfleet Refining Co., Ltd., Hull, had a higher cholesterol-lowering activity.

The fatty acid fraction accounts for most if not all of the activity, the scientists report in *Nature* (April 25).

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